

Data Fundamentals Lab 7: Exploring Data with Pivot Table

Scenario

In this lab, you will explore USAID foreign aid in order to find the amount of aid given to Sub-Saharan Africa¹ in different view like assistance category or year. To do this, you will use the one of spreadsheet software's best features - **Pivot Tables**, which helps summarise data that is in categories. Using Pivot Tables, you can create an interactive cross-tabulation of your data by category.

Questions

Pivot Tables are an excellent tool in spreadsheet software to localise specific data inside of a big or huge data document. It gives you quick answer to some questions that you have developed in an investigation. As an example we formulate a couple of questions for these tutorial. Remember we use just data from Sub-Saharan Africa.

Q1: How much money has USAID given to Sub-Saharan Africa countries?

Q2: From Q1, which are the top three recipient countries?

Q3: Which sectors receive the most funding by USAID? Identify the top 5 sectors.

Q4: From the top 5 sectors identified in Q3, identify the top 5 recipient countries in each sector.

¹ The criteria for countries was taken from [UNDP Africa](#)

Q5: How much money had USAID given to Tanzania in the last 5 years (between 2013-2017)?

Q6: From Q5 (2013-2017), which are the top 5 sectors that have received funding in Tanzania?

Get Data

1. Open the **us_foreign_aid_usg_sector_ssa.xlsx**
2. Review the column labels in **USAID Aid Complete**
 - a. First sheet is a **Source** of the data
 - b. Sheet **Original** is the USAID dataset download from USAID data.
 - c. **Copy** sheet is a copy of the original dataset to avoid mistake in the original dataset.
 - d. **SubSaharanAfrica** is a sheet with an initial filter of columns that are not relevant for this exercise.

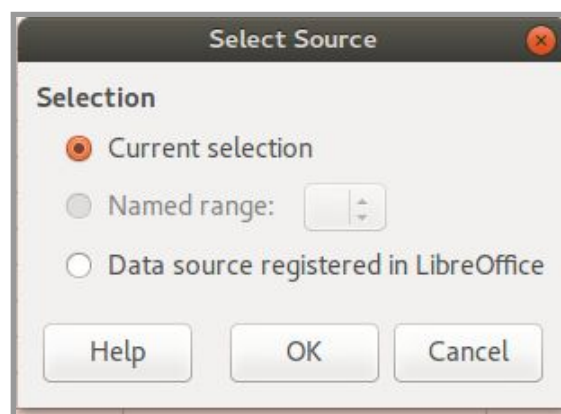
Creating a Pivot Table

Here is how to create a pivot table:

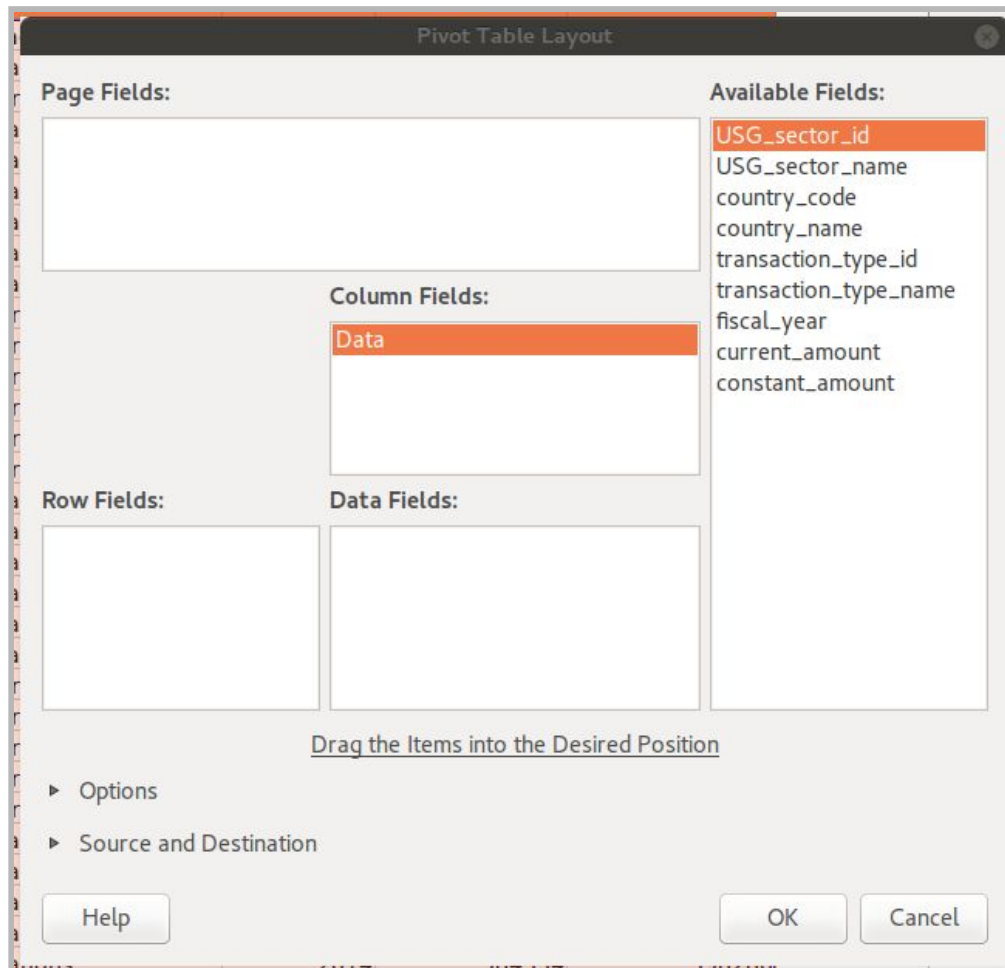
3. We are going to work in the **SubSaharanAfrica** sheet tab.
4. Ensure that every column of your data has a label.
5. Select all the data in the table.
6. Then go to toolbar, click the **Insert** tab, and then click the **Pivot Table** icon.

	A	B	C	D	E	F	G	H	I
27200	52	Multi-sector - Unspecified	SEN	Senegal	3	Disbursements	2005	18201	22150
27201	52	Multi-sector - Unspecified	SEN	Senegal	3	Disbursements	2006	840193	990265
27202	52	Multi-sector - Unspecified	SEN	Senegal	3	Disbursements	2007	1663865	1909217
27203	52	Multi-sector - Unspecified	SEN	Senegal	3	Disbursements	2008	210645	236792
27204	52	Multi-sector - Unspecified	SEN	Senegal	3	Disbursements	2017	418505	410960
27205	52	Multi-sector - Unspecified	STP	Sao Tome and Principe	2	Obligations	2004	30000	37655
27206	52	Multi-sector - Unspecified	STP	Sao Tome and Principe	3	Disbursements	2004	30000	37655
27207	52	Multi-sector - Unspecified	TZA	Tanzania	3	Disbursements	2017	60000	58918
27208	52	Multi-sector - Unspecified	TZA	Tanzania	3	Disbursements	2018	50000	48125
27209	52	Multi-sector - Unspecified	UGA	Uganda	2	Obligations	2004	2500	3138
27210	52	Multi-sector - Unspecified	UGA	Uganda	3	Disbursements	2004	2500	3138
27211	52	Multi-sector - Unspecified	UGA	Uganda	3	Disbursements	2007	5000	5737
27212	52	Multi-sector - Unspecified	ZAF	South Africa	2	Obligations	2001	405471	540109
27213	52	Multi-sector - Unspecified	ZAF	South Africa	2	Obligations	2002	808000	1059159
27214	52	Multi-sector - Unspecified	ZAF	South Africa	2	Obligations	2006	1000	1179
27215	52	Multi-sector - Unspecified	ZAF	South Africa	2	Obligations	2015	3500	3542
27216	52	Multi-sector - Unspecified	ZAF	South Africa	2	Obligations	2017	228073	223961
27217	52	Multi-sector - Unspecified	ZAF	South Africa	3	Disbursements	2001	405471	540109
27218	52	Multi-sector - Unspecified	ZAF	South Africa	3	Disbursements	2002	808000	1059159
27219	52	Multi-sector - Unspecified	ZAF	South Africa	3	Disbursements	2007	650872	746850
27220	52	Multi-sector - Unspecified	ZAF	South Africa	3	Disbursements	2015	2973	3008
27221	52	Multi-sector - Unspecified	ZAF	South Africa	3	Disbursements	2018	10298	9912
27222									
27223									

7. A Select Source window opens up. Keep the selection as **Current selection** and click **OK**.



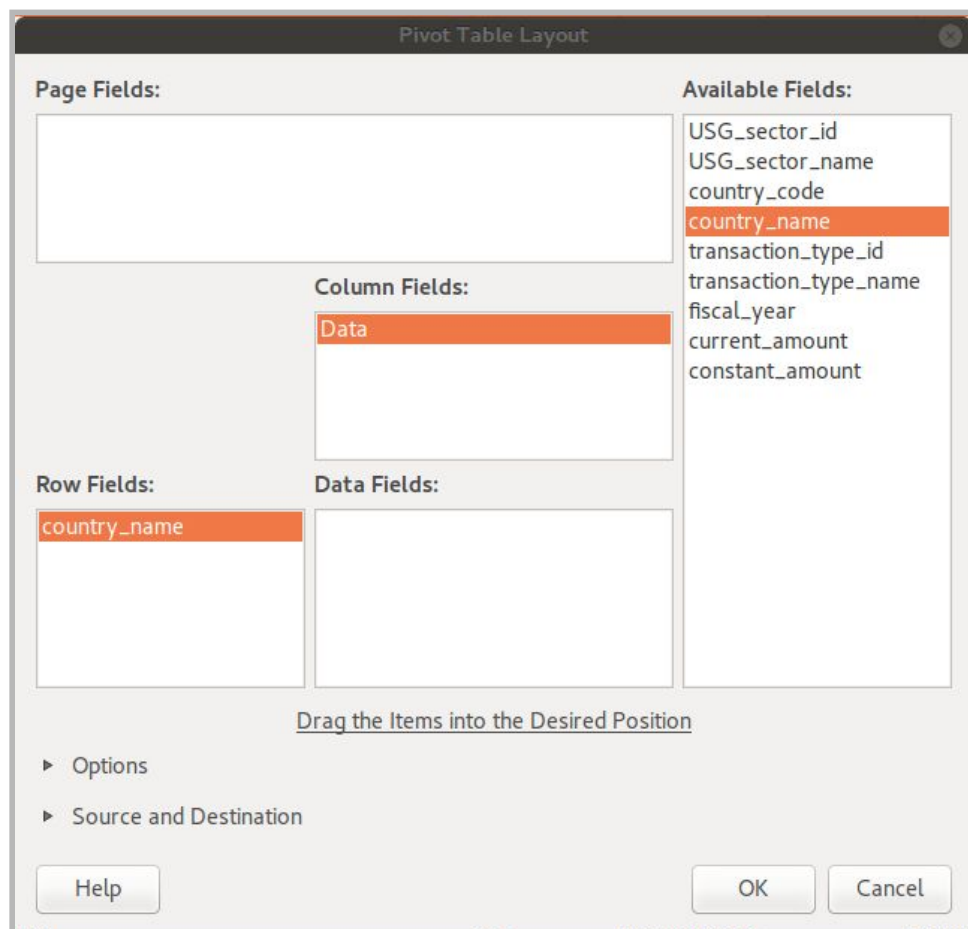
8. The **Pivot Table Layout** window pops up.



9. There are 4 main components in the Pivot Table Layout window,
- Available Fields (Field Name in Excel):** all the columns from the data set (in this case, the SubSaharanAfrica tab).
 - Column Fields (Columns in Excel):** where you drag the field(s) that you want to show as a column in the pivot table.
 - Row Fields (Rows in Excel):** where you drag the field(s) that you want to show in the row(s) in the pivot table.
 - Data Fields (Values in Excel):** is a tool for mostly numeric fields that are going to be calculated.
 - Page Fields (Filters in Excel):** will help to filter the different fields.

Q1: How much money has USAID given to Sub-Saharan African countries?

10. It is always important to read the question and formulate it well. In this case, we need the list of the Sub-Saharan African countries by dragging the **country_name** field from the Pivot Table to **Row Fields** box where we will have the list of countries.

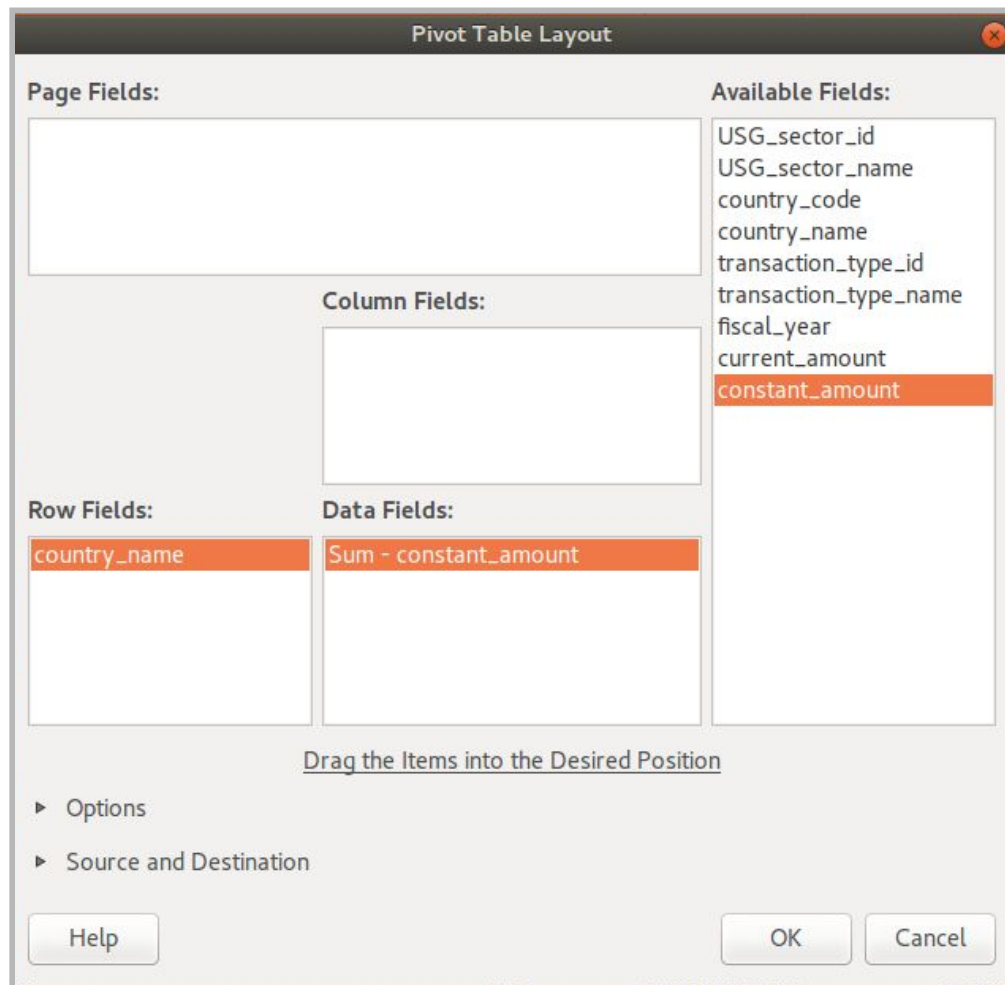


11. Now question 1 refers to the amount of money given by USAID.
- A note about the amounts fields “Current dollar amounts are the actual amounts. Constant dollar amounts are inflation-adjusted values. The constant dollar series allows you to evaluate, on a

comparable basis, values that occurred at different time periods.”²

So we will use the **constant_amount field** to answer this question.

- b. Because we need to calculate the amount of money given by USAID to these countries, we use the **Data Fields** box in the Pivot Table panel.
- c. Click and drag constant_amount to Data Fields.



12. Click on **OK**. A new sheet is created named Pivot Table_SubSaharanAfrica_1. Right-click on the sheet and rename it **Q1**.

² Frequently asked questions [USAID](#) web page.

26	Madagascar	2702767430
27	Malawi	5762092437
28	Mali	5281826547
29	Mauritania	735610977
30	Mauritius	26160146
31	Mozambique	9855562325
32	Namibia	2843184033
33	Niger	2427248436
34	Nigeria	12602858289
35	Rwanda	4580875477
36	Sao Tome and Principe	38907315
37	Senegal	4460178697
38	Seychelles	20358394
39	Sierra Leone	1632055490
40	South Africa	12653367421
41	South Sudan	8511351073
42	Swaziland	790200587
43	Tanzania	12206679890
44	Togo	165649699
45	Uganda	12910116291
46	Zambia	8108338371
47	Zimbabwe	4926386201
48	Total Result	203967253624

13. **Q1: How much money had USAID given to Sub-Saharan African countries?**

Answer: Pivot Tables make a row called **Total Result** and here is the answer to Q1. USAID had given **203,967,253,624** to Sub-Saharan African countries **from 2001 to 2017**.

Q2: From Q1, which are the top three recipient countries of USAID funds from 2001 to 2017?

14. Select Row 1 and create a Filter.
15. Right click the black arrow at the right corner of the **Sum-constant amount** column (column B).
16. Select Sort Descending (Sort Largest to Smallest in Excel)

	A	B
1	country_name	Sum - constant amount
2	Total Result	203967253624
3	Ethiopia	23204979639
4	Kenya	19459311322
5	Uganda	12910116291
6	South Africa	12653367421
7	Nigeria	12602858289
8	Tanzania	12206679890
9	Mozambique	9855562325
10	Congo (Kinshasa)	9562200727
11	South Sudan	8511351073
12	Zambia	8108338371
13	Liberia	6900499973
14	Ghana	6039837319
15	Malawi	5762092437
16	Mali	5281826547
17	Zimbabwe	4926386201
18	Rwanda	4580875477
19	Senegal	4460178697
20	Chad	3252569503
21	Angola	3024894188
22	Namibia	2843184033
23	Madagascar	2702767430
24	Niger	2427248436
25	Benin	2393709983
26	Cote d'Ivoire	2357832071
27	Botswana	2327060049
28	Burkina Faso	2271692351

17. From Q1, which countries are the top 3?

Answer: Excluding the Total Result, you can see the top three countries are: Ethiopia with \$23,204,979,639, Kenya with \$19,459,311,322 and Uganda with \$12,910,116,291.

Q3: Which sectors receive the most funding by USAID?

Identify top first 5 sectors.

18. Go to the **SubSaharanAfrica** sheet.

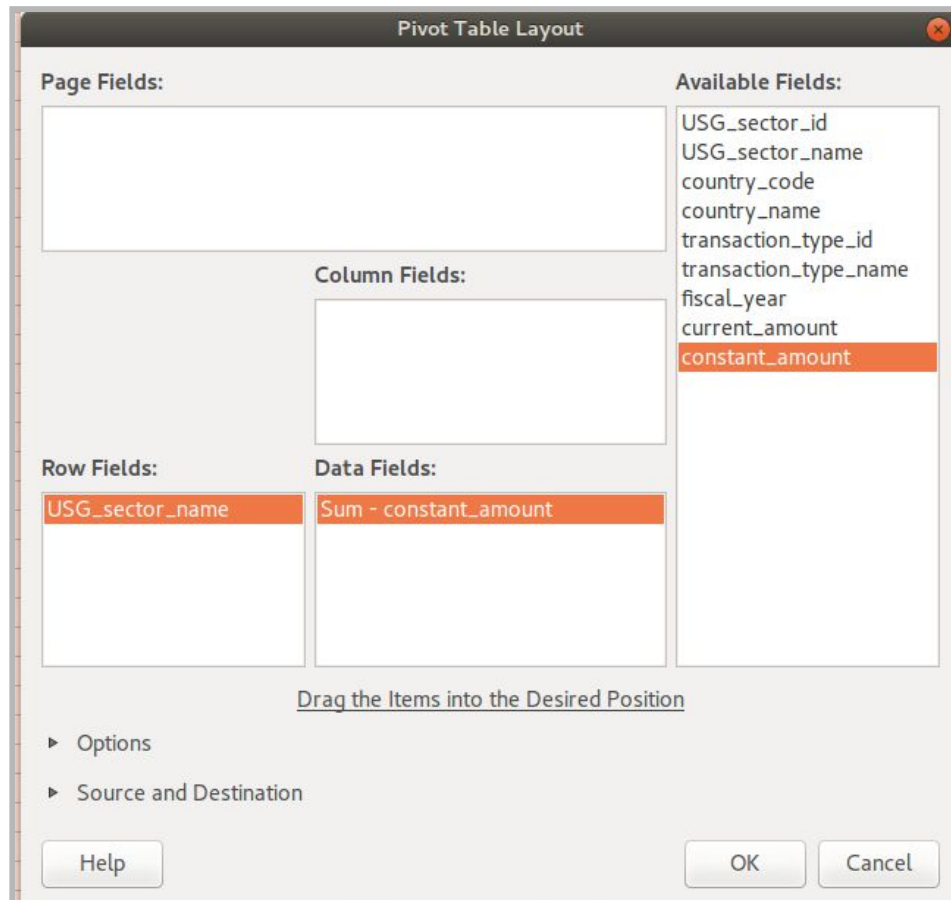
19. Select all the data.

20. Go to Insert - Pivot Table.

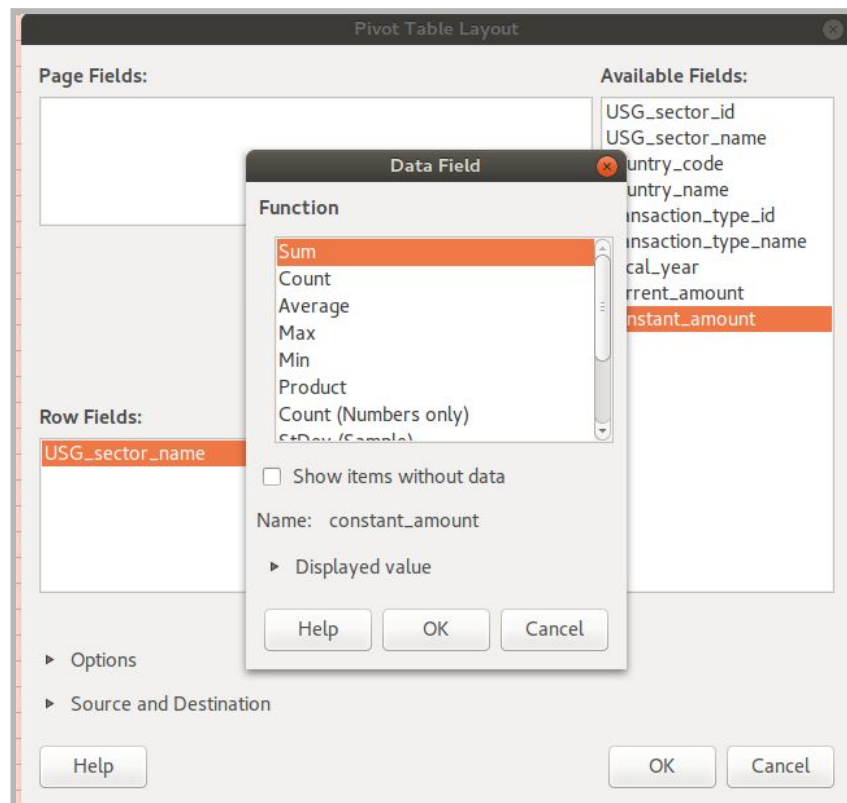
21. Rename the new sheet as Q3

22. Click and drag **USG_sector_name** to the Row Fields box

23. Click and drag **constant_amount** to the Data Fields box



24. In some cases, by default the spreadsheet software will count the individual results in the Pivot Table, but sometimes we need another type of aggregation of the constant_amount instead. To change this option:
- Double-click on the **Sum - constant_amount** option under Data Fields box. This opens a Data Field window.
 - Change **Sum** to another function such as **Count** or **Average** in the Function panel.
 - Click on OK.



- d. For this exercise, we will maintain the function as Sum. Click OK.
25. Click OK when you return to the Pivot Table Layout. This opens a new sheet. Rename the sheet **Q3**.
 26. Now that we have summed up the constant_amount, select this column in the pivot table and sort from largest to smallest.

	A	B
1	USG_sector_name	Sum - constant amount
2	Total Result	203967253624
3	HIV/AIDS	65333299445
4	Protection, Assistance and Solutions	45936185516
5	Agriculture	11731733644
6	Direct Administrative Costs	9327852917
7	Malaria	9137977989
8	Infrastructure	6401971282
9	Basic Education	6100065599
10	Social Services	5540020620
11	Maternal and Child Health	4039889596
12	Family Planning and Reproductive Health	3829482965
13	Stabilization Operations and Security Sector Reform	3664499231
14	Good Governance	3042881538
15	Nutrition	3013921536
16	Water Supply and Sanitation	2686962280
17	Other Public Health Threats	2134813192
18	Rule of Law and Human Rights	1872113776
19	Economic Opportunity	1835579044
20	Counter-Terrorism	1787390446

27. Which of the sectors have the biggest contribution by USAID from 2001 to 2017? Identify the first 5 sectors.

Answer:

HIV/AID	\$65,333,299,445
Protection, Assistance and Solutions	\$45,936,185,516
Agriculture	\$11,731,733,644
Direct Administrative Costs	\$9,327,852,917
Malaria	\$9,137,977,989

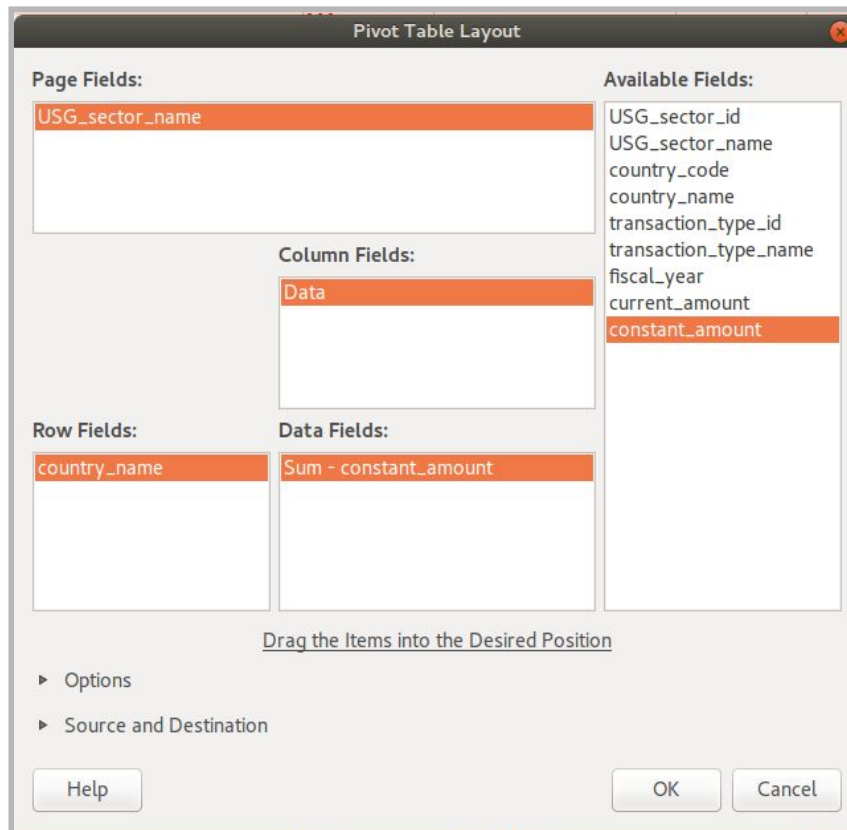
Q4: From the top 5 sectors identified in Q3, identify the top 5 recipient countries in each sector.

28. Go to the **SubSaharanAfrica** sheet

29. Select all the data.

30. Go to Insert - Pivot Table.

31. Click and drag the **USG_sector_name** field in the **Page Fields (or Filter in Excel)** panel.
32. Click and drag **country_name** to the Row Fields (or Row in Excel).
33. Click and drag **constant_amount** to the Data Field (or Values panel in Excel), remember to change to the SUM function if it is necessary.



34. Rename the new sheet as Q4.
35. Select row 3 and create a filter.

	A	B
1	USG_sector_name	- all -
2		
3	country_name	Sum - constant amount
4	Angola	3024894188
5	Benin	2393709983
6	Botswana	2327060049
7	Burkina Faso	2271692351
8	Burundi	2119655807
9	Cabo Verde	565086371
10	Cameroon	1158811713
11	Central African Republic	976882168
12	Chad	3252569503
13	Comoros	19070169
14	Congo (Brazzaville)	244074651
15	Congo (Kinshasa)	9562200727
16	Cote d'Ivoire	2357832071
17	Equatorial Guinea	13834066
18	Eritrea	937129481

36. Using the USG_sector_name filter at the top, select the one of the top 5 sectors from Q3 (for example HIV/AIDS)
37. Click on the arrow in the Sum- constant_amount cell and select Sort Descending to see the top 5 countries who received USAID funds for HIV/AIDS.

	A	B
1	USG_sector_name	HIV/AIDS
2		
3	country_name	Sum - constant amount
4	South Africa	10114523470
5	Kenya	9329552811
6	Nigeria	6954717457
7	Uganda	5853192449
8	Tanzania	5806727059
9	Zambia	4754842575
10	Ethiopia	4434394180
11	Mozambique	4209620713
12	Botswana	2121898720
13	Rwanda	1818150242
14	Namibia	1711140459
15	Cote d'Ivoire	1613133619
16	Malawi	1429778603
17	Zimbabwe	1324445661

38. Repeat the steps (36 and 37) for the other 4 sectors (Protection, Assistance and Solutions, Agriculture, Direct Administrative Costs , and Malaria).

Answer:

USG Sector Name	Top 5 Countries
HIV/AIDS	South Africa, Kenya, Nigeria, Uganda, Tanzania
Protection, Assistance and Solutions	Ethiopia, South Sudan, Congo (Kinshasa), Kenya, Chad
Agriculture	Ghana, Mozambique, Mali, Ethiopia, Kenya
Direct Administrative Costs	Senegal, South Africa, Mozambique, Nigeria, Tanzania
Malaria	Tanzania, Nigeria, Uganda, Ethiopia, Kenya

Q5: How much money had USAID given to Tanzania in the last 5 years (between 2013-2017)?

39. Go to the **SubSaharanAfrica** sheet

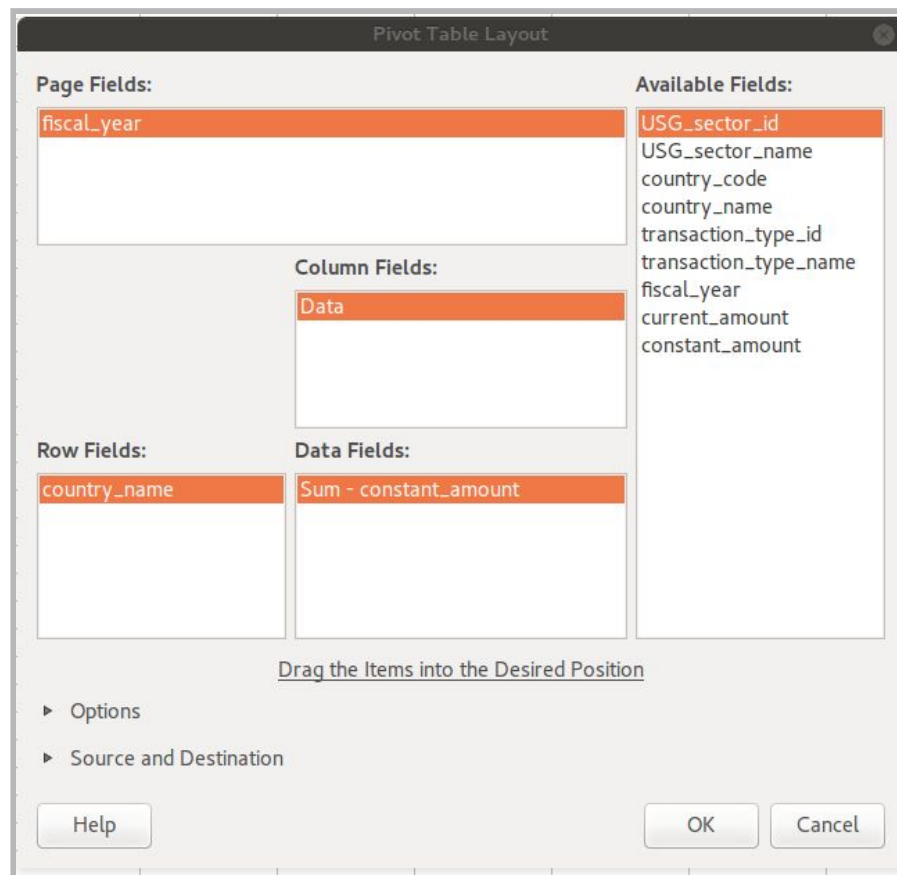
40. Select all the data.

41. Go to Insert - Pivot Table.

42. Click and drag the **fiscal_year** field in the **Page Fields (or Filter in Excel)** panel.

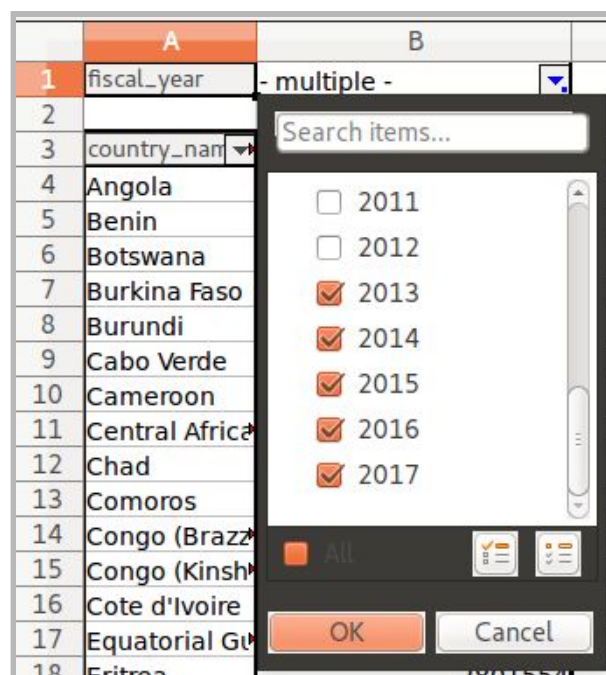
43. Click and drag **country_name** to the Row Fields (or Row in Excel).

44. Click and drag **constant_amount** to the Data Field (or Values panel in Excel). Click OK.



45. Rename the new sheet as Q5.

46. Click on the arrow by the **fiscal_year** filter in cell B1 and select on **2013 to 2017**. Click **OK**.



47. Select Tanzania from the country_name filter in cell A3 and click OK.

	A	B
1	fiscal_year	- multiple -
2		
3	country_name	Sum - constant amount
4	Tanzania	5443157418
5	Total Result	5443157418
6		

Q5: How much money had USAID given to Tanzania in the last 5 years (between 2013-2017)?

Answer: Tanzania received an amount of \$5,443,157,418 from the USAID between 2013 and 2017.

Q6: From Q5 (2013-2017), which are the top 5 sectors that have received funding in Tanzania?

48. Go to the **SubSaharanAfrica** sheet

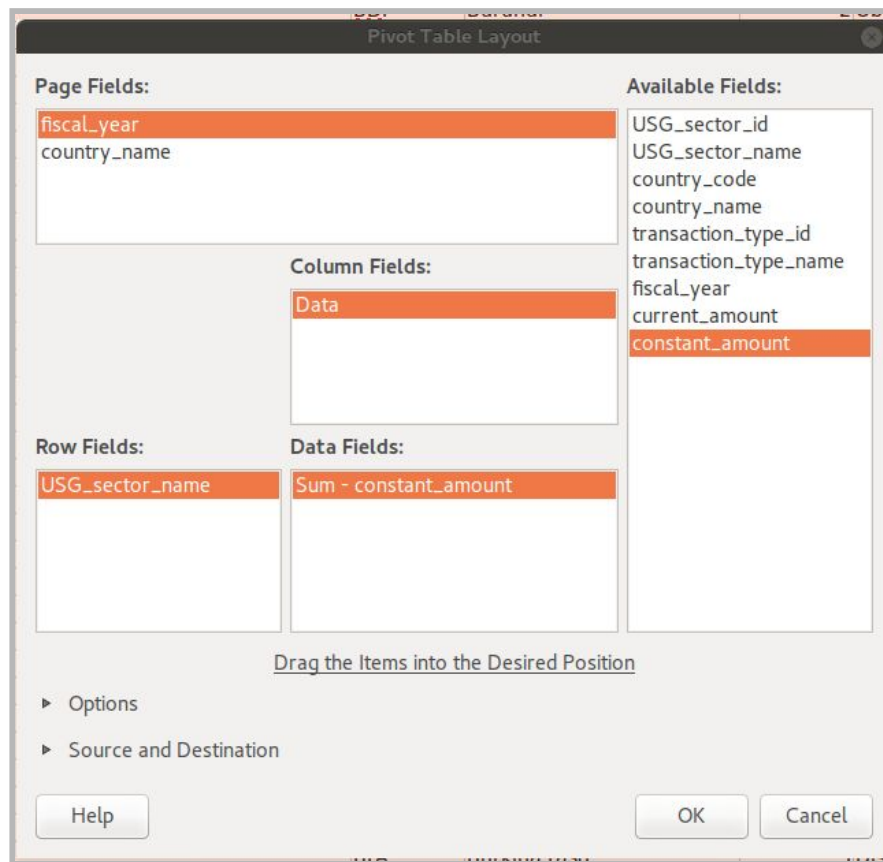
49. Select all the data.

50. Go to Insert - Pivot Table.

51. Click and drag the **fiscal_year** and **country_name** fields to the **Page Fields (or Filter in Excel)** panel.

52. Click and drag **USG_sector_name** to the Row Fields (or Row in Excel) panel.

53. Click and drag **constant_amount** to the Data Field (or Values panel in Excel). Click OK.



54. Rename the new sheet as Q6.

55. Click on the arrow by the **fiscal_year** filter in cell B1 and select on **2013 to 2017**. Click **OK**.

	A	B
1	fiscal_year	- all -
2	country_name	
3		
4	USG_sector_name	
5	Agriculture	
6	Basic Education	
7	Civil Society	
8	Clean Productive Environment	
9	Combating Weapons of Mass Destruction (WMD)	
10	Conflict Mitigation and Reconciliation	
11	Counter-Narcotics	
12	Counter-Terrorism	
13	Democracy, Human Rights, and Governance - General	
14	Direct Administrative Costs	
15	Disaster Readiness	
16	Economic Development - General	
17	Economic Opportunity	
18	Education and Social Services - General	
19	Environment	

56. Click on the arrow by the **country_name** filter in Cell B2 and select **Tanzania**. Click **OK**.

	A	B
1	fiscal_year	- multiple -
2	country_name	- all -
3		
4	USG_sector_name	Search items...
5	Agriculture	<input type="checkbox"/> South Sudan
6	Basic Education	<input type="checkbox"/> Swaziland
7	Civil Society	<input checked="" type="checkbox"/> Tanzania
8	Clean Productive Environment	<input type="checkbox"/> Togo
9	Combating Weapons of Mass Destruction (WMD)	<input type="checkbox"/> Uganda
10	Conflict Mitigation and Reconciliation	<input type="checkbox"/> Zambia
11	Counter-Narcotics	<input type="checkbox"/> Zimbabwe
12	Counter-Terrorism	
13	Democracy, Human Rights, and Governance - General	
14	Direct Administrative Costs	
15	Disaster Readiness	
16	Economic Development - General	
17	Economic Opportunity	
18	Education and Social Services - General	
19	Environment	49267613
20	Environment - General	51393235

57. Create a filter on the Sum - constant amount cell in B4 and sort the column by descending.

	A	B
1	fiscal_year	- multiple -
2	country_name	Tanzania
3		
4	USG_sector_name	Sum - constant amount
5	HIV/AIDS	2653892385
6	Agriculture	513893214
7	Infrastructure	417539883
8	Malaria	397696597
9	Direct Administrative Costs	243304647
10	Family Planning and Reproductive Health	217447216
11	Nutrition	163768779
12	Basic Education	146795702
13	Protection, Assistance and Solutions	126109417
14	Maternal and Child Health	111993761
15	Health - General	60262333
16	Natural Resources and Biodiversity	55512826
17	Water Supply and Sanitation	41349084

Q6: From Q5 (2013-2017), which are the top 5 sectors that have received funding in Tanzania?

Answer:

USG Sector Name	Constant Amount
HIV/AIDS	\$2,653,892,385
Agriculture	\$513,893,214
Infrastructure	\$417,539,883

Malaria	\$397,696,597
Direct Administrative Costs	\$243,304,647