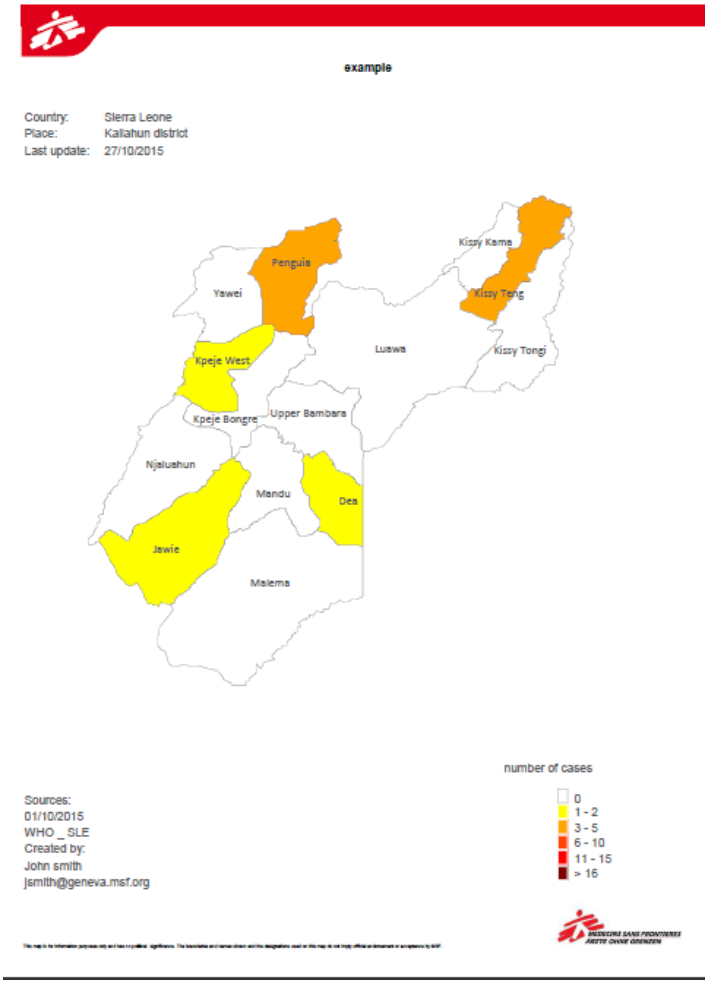
TUTORIAL: CHOROPLETH MAPS WITH EXCEL

This tutorial's aim is to show how to create a Choropleth map with Microsoft Excel. A choropleth map is a thematic map in which areas are shaded or patterned in proportion to the measurement of the statistical variable being displayed on the map, such as population density or per-capita income. *"The choropleth map provides an easy way to visualize how a measurement varies across a geographic area or it shows the level of variability within a region"* (Wikipedia). Excel choropleth maps can be an easy tool for non-advanced GIS users for regular updates of a specific situation in a given area (evolution of an epidemic for example). This tutorial shows how a GIS specialist can create an Excel mapping tools, that can then be managed independently by any user.



Requirements:

The Excel mapping tools work with Macros. To avoid compatibility issues prefer Microsoft Excel version 2007 or newer.

I. Principle

The principle is simple, we will insert a .emf (enhanced meta file) document in an Excel spreadsheet, separate the image and define a name for each form / label to link information in the Excel worksheet to forms. VBA script present in the template will vary the colors of each shape according to the set values.

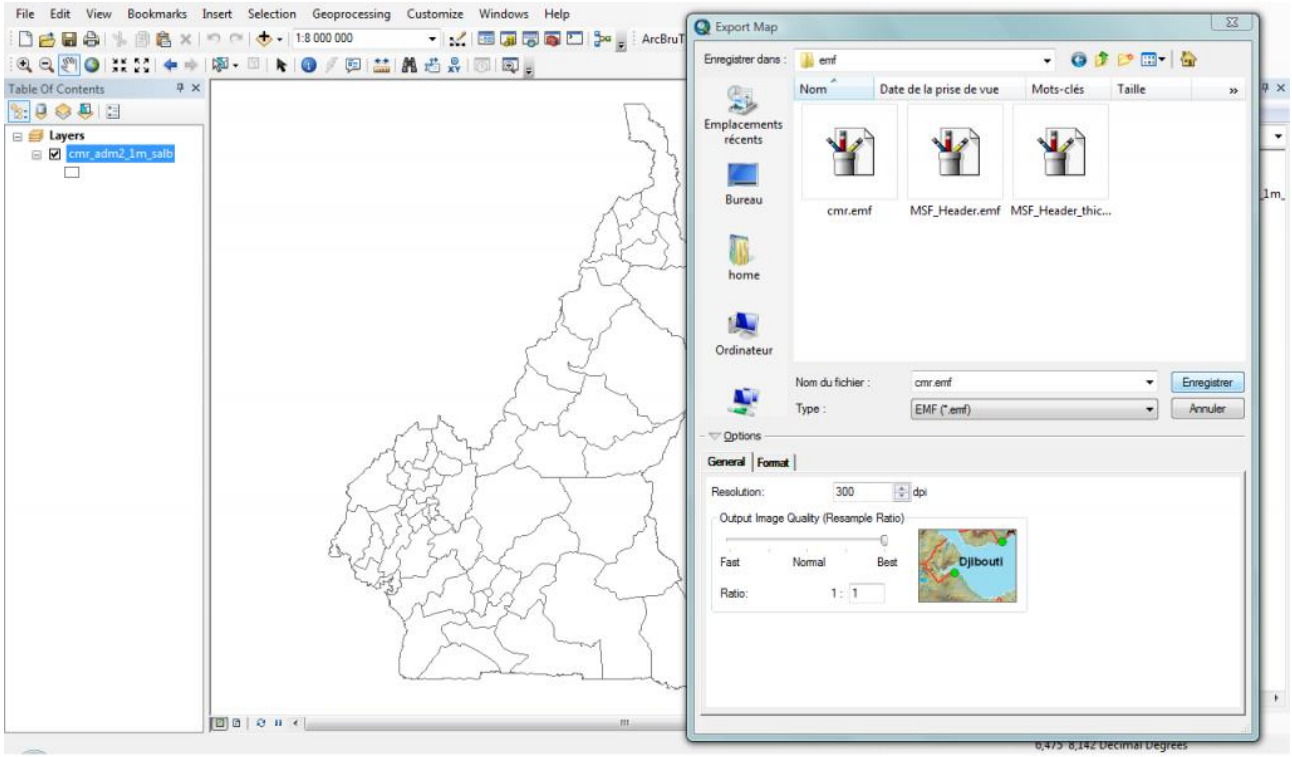
II. Set up

Use the attached xlsmaptools template and make sure to save the original template in the Source folder to retrieve it if necessary. Be careful not to add / remove lines into the document, copy and paste only the values. This template is made with an MSF style. To change the header, go to "page layout" and change the logo accordingly.

III. .emf creation

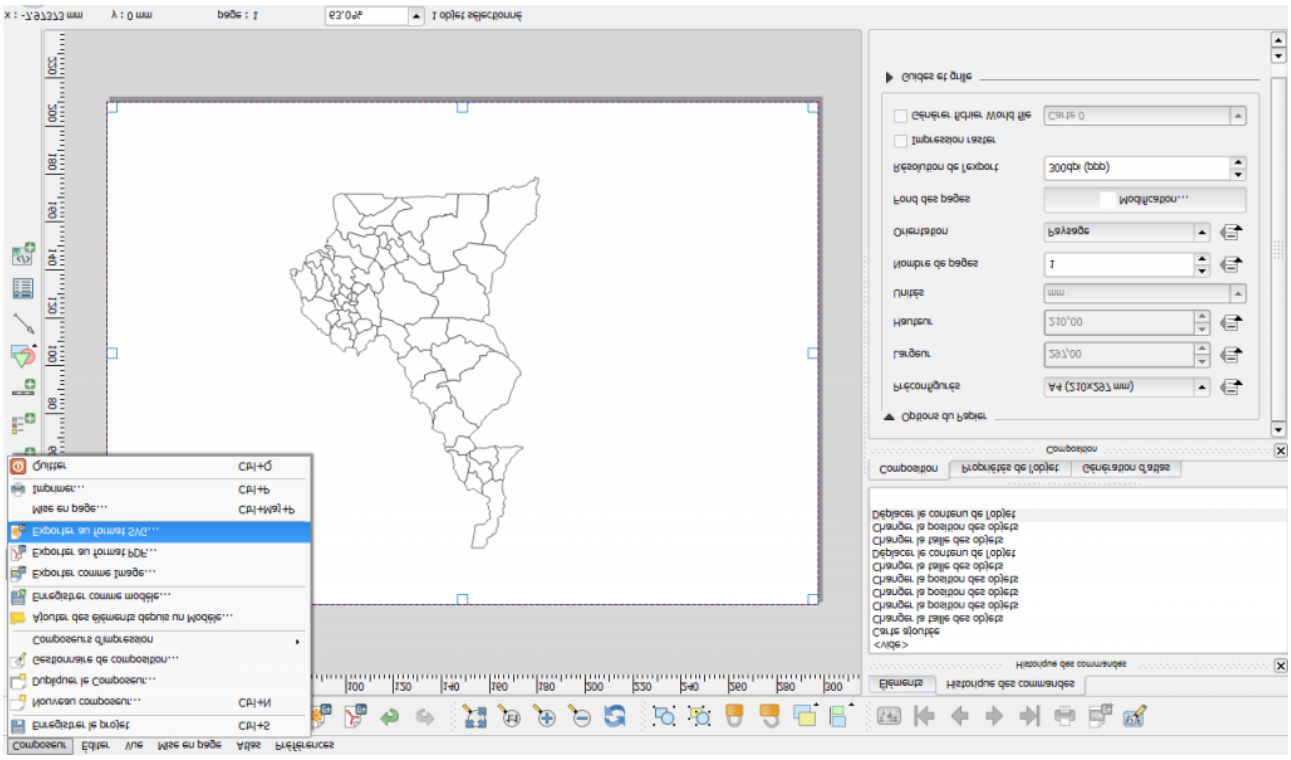
1. With ArcGIS

Make sure your map display doesn't contain any specific symbology (no filling) or any labels, then export your .emf file in your workspace:

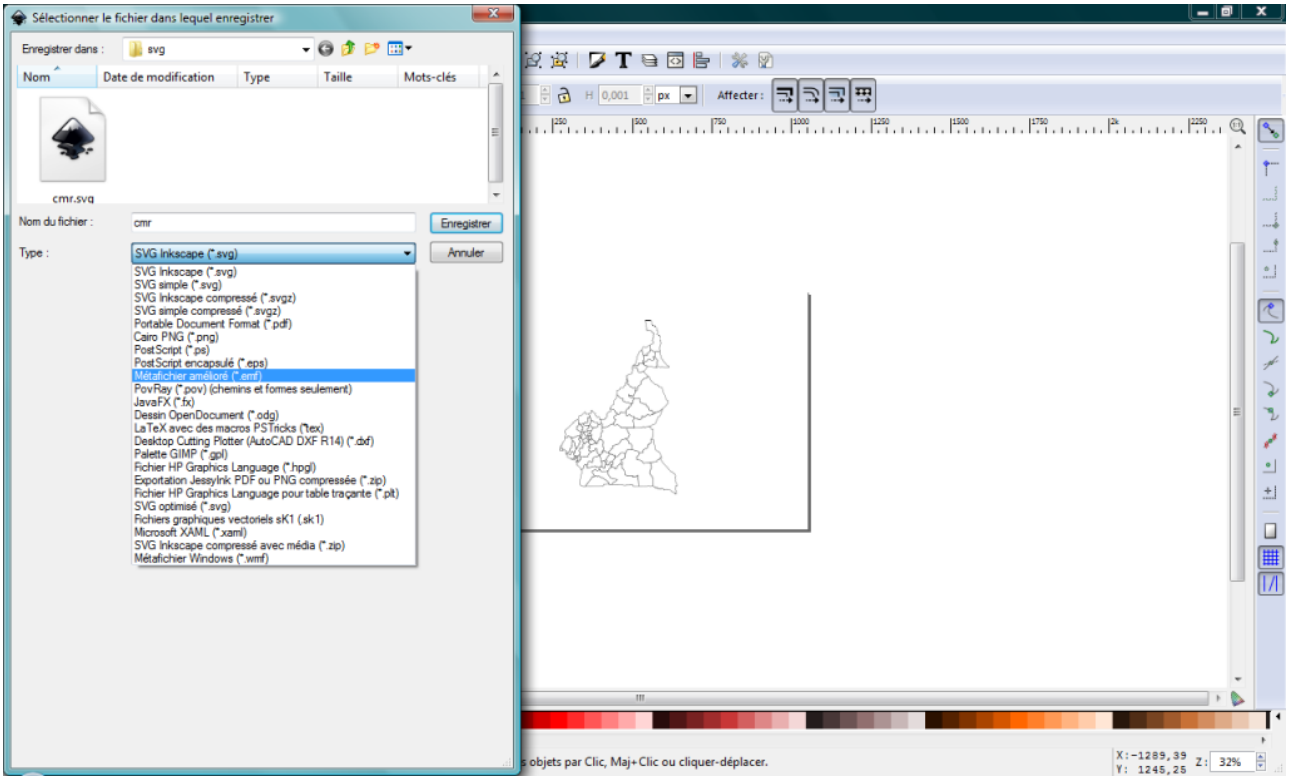


2. With QGIS

Make sure your map display doesn't contain any specific symbology (no filling) or any labels, then export your map as *.svg* in your workspace:



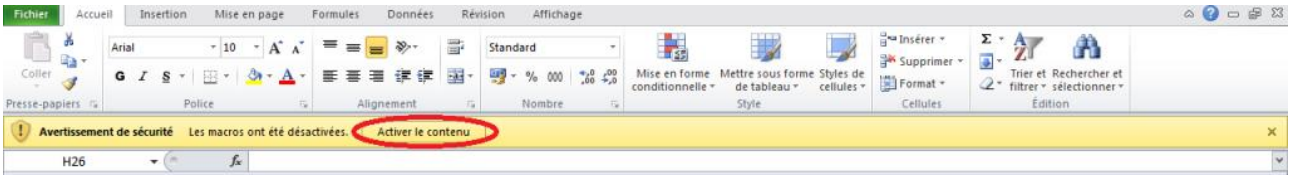
In Inkscape (download link: https://inkscape.org/), open the *.svg* file then save as *.emf* in your workspace.



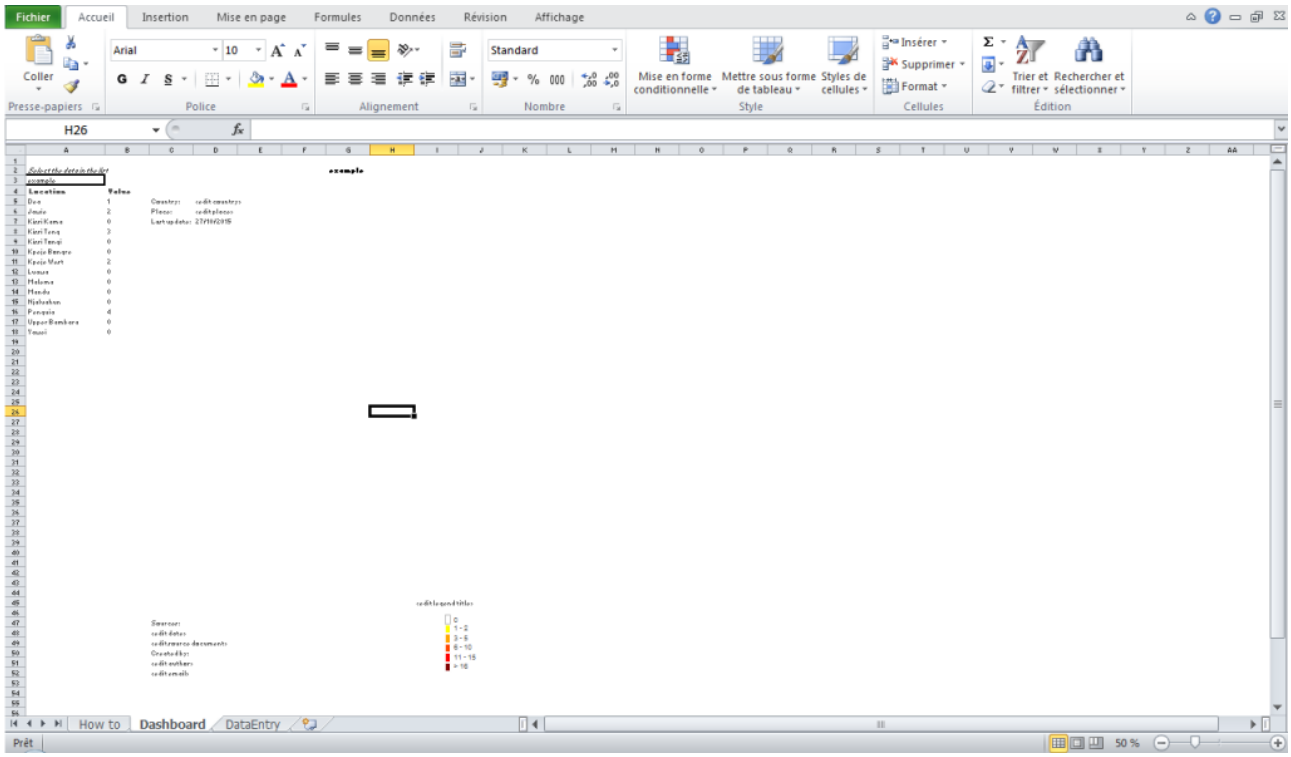
Note: If you only have a picture file (.png , .jpg , .bmp, etc.), online converters are also available to convert pictures into *.emf*.

IV. Choropleth maps

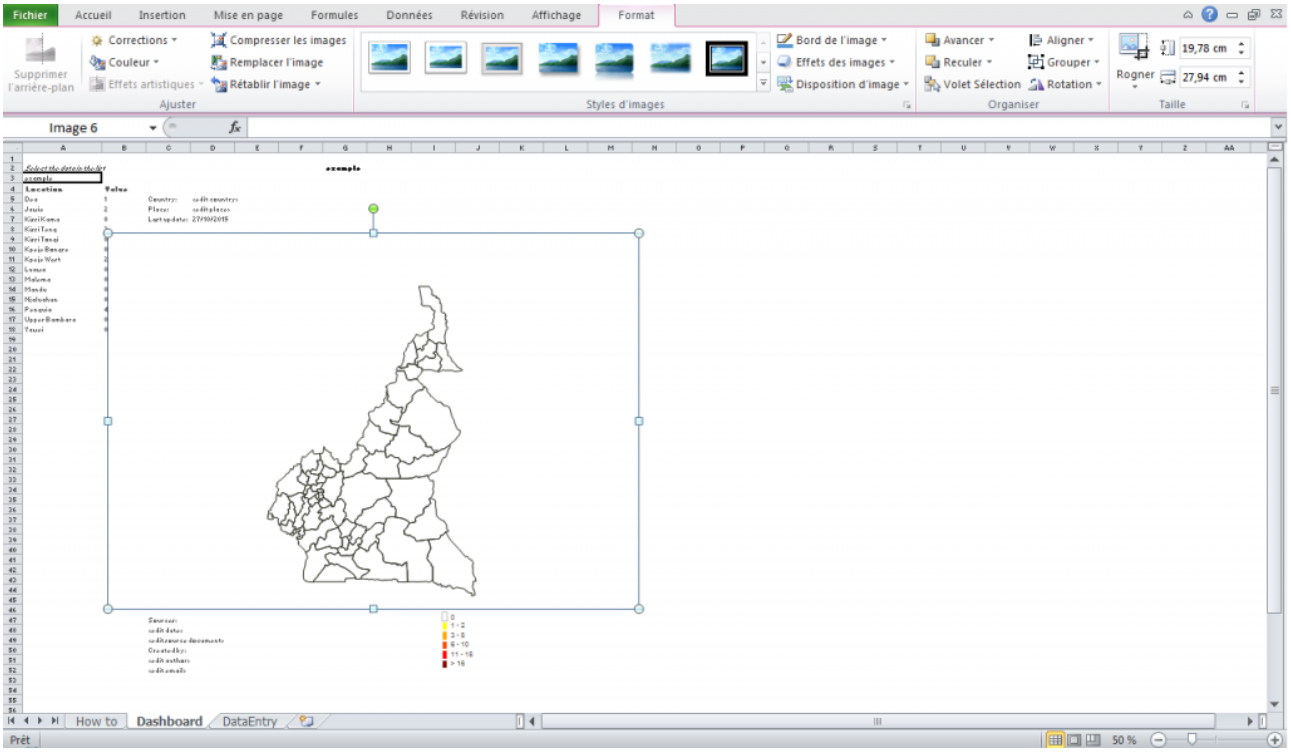
1. Copy the file named xlsmaptools_template.xls
2. Paste it in your workspace.
3. Rename it as the name of your new document.
4. Open your document and **enable the macros**:



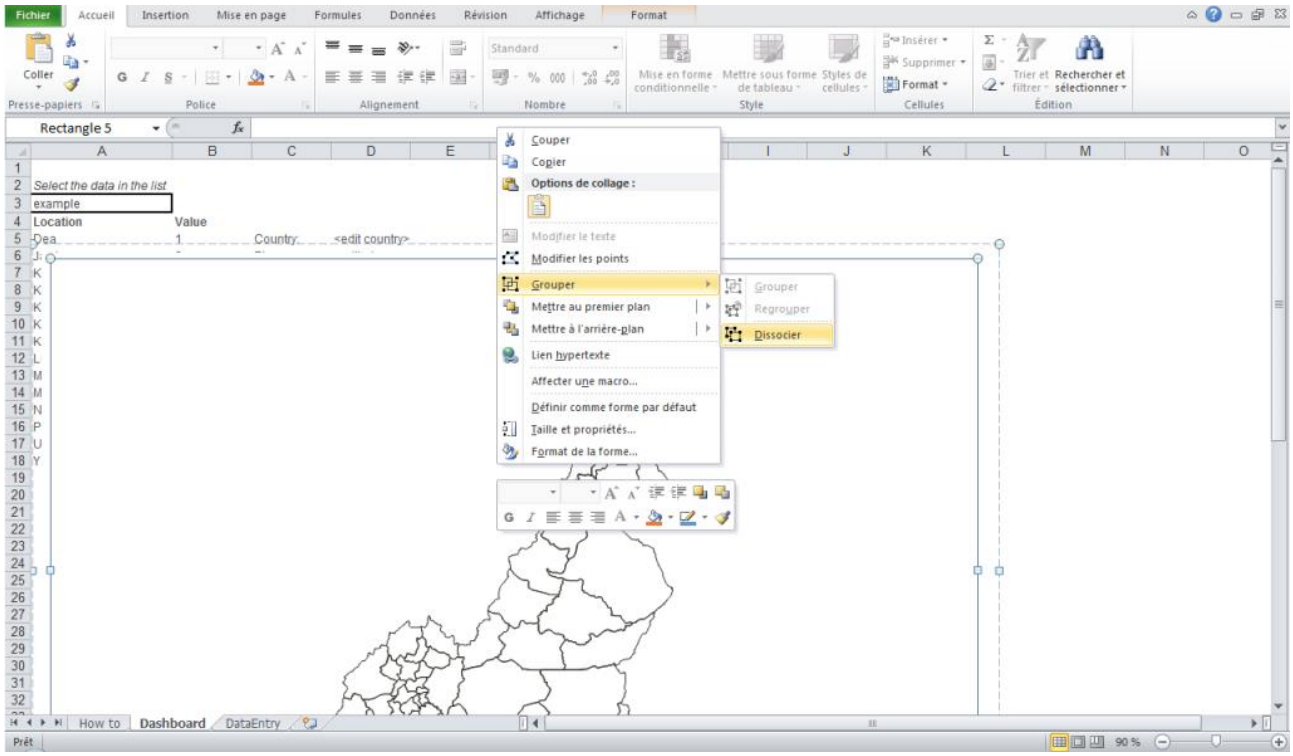
5. In *Dashboard* worksheet, delete the map and all the labels. Keep the legend



6. Insert your .emf image (Insert/Image/path of the .emf doc) in your Excel doc:

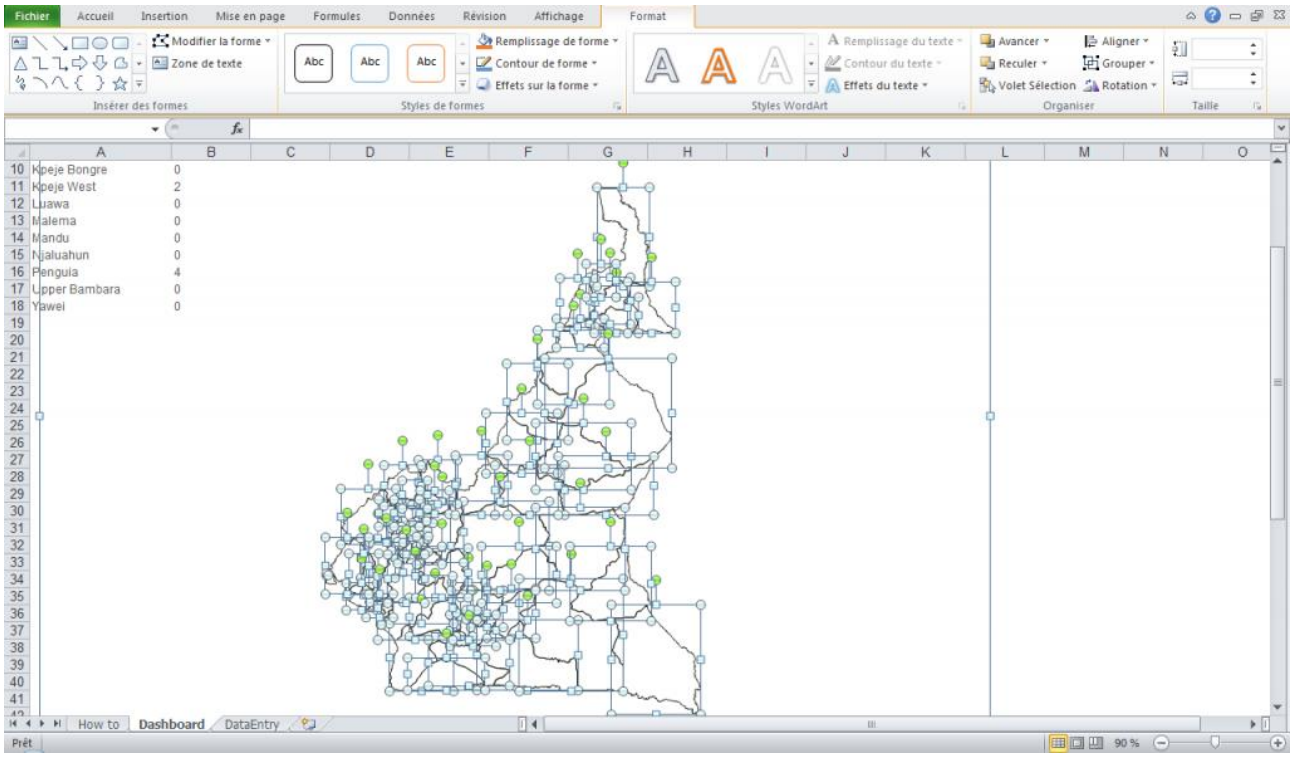


7. Delete the unnecessary Freeforms then adapt your image to the worksheet to obtain a good visual.
8. Ungroup the image. **Right click on the image Group/ungroup:**

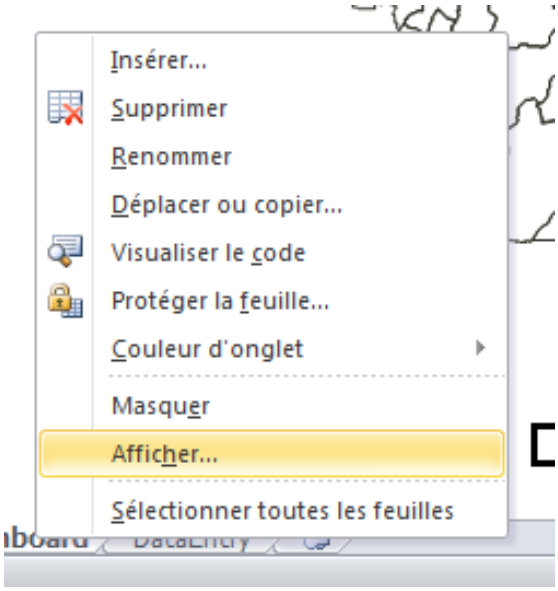


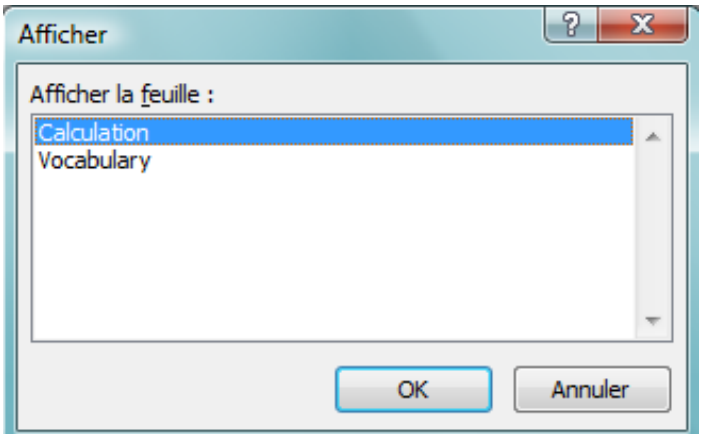
Note: In case of important problems of distortion of your image after ungrouping, insert the image into Microsoft PowerPoint, right click on the image/ Group/Ungroup and select all (Ctrl+A) and copy/paste objects in the Excel worksheet

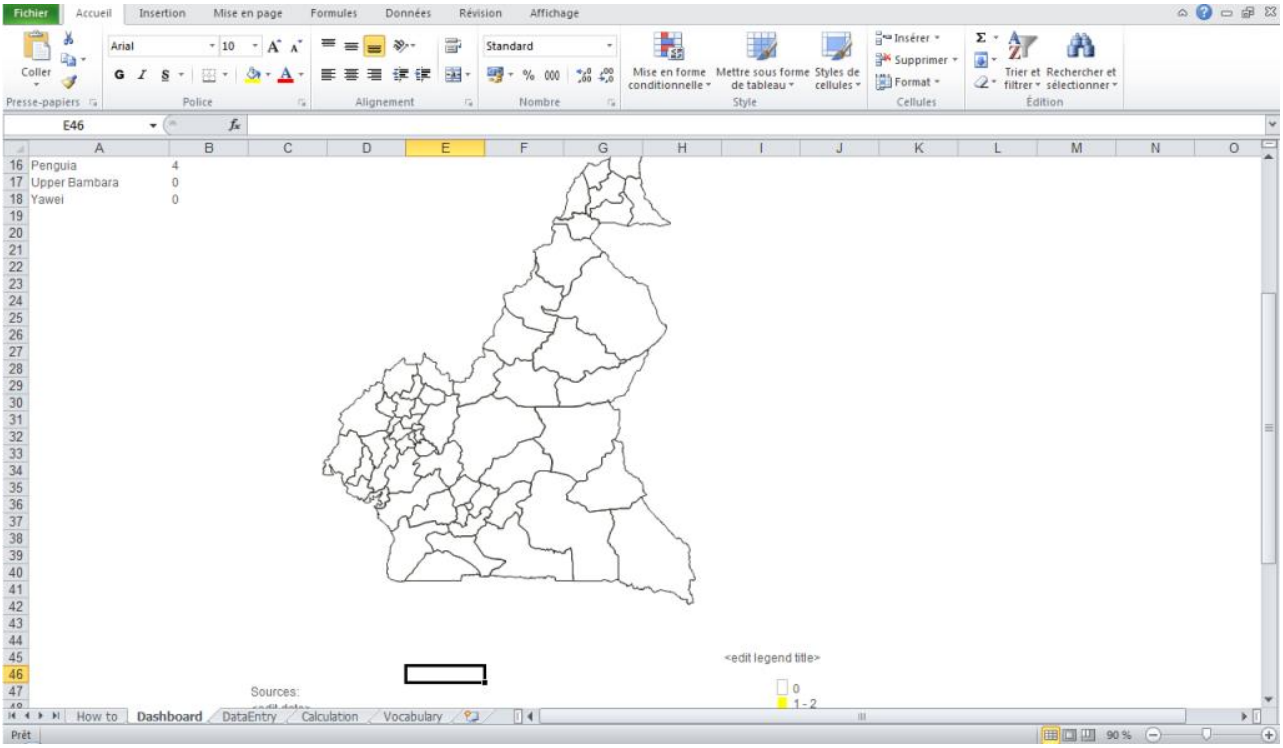
- Click in one Freeform and select all (Ctrl+A) (Figure 9). In the *Menu toolbar/shape fill* select *no fill*.



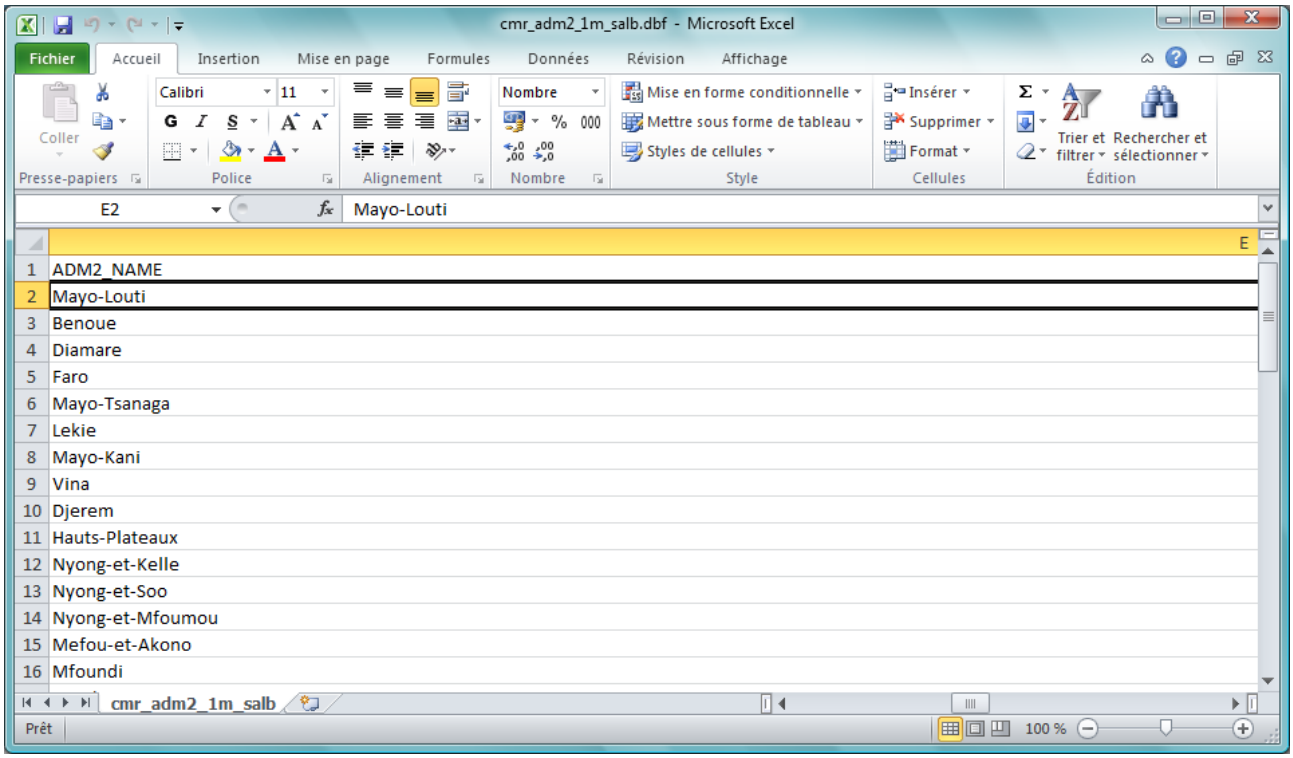
- On the Excel file, display worksheets Calculation and Vocabulary (right-click a tab > Un-hide):

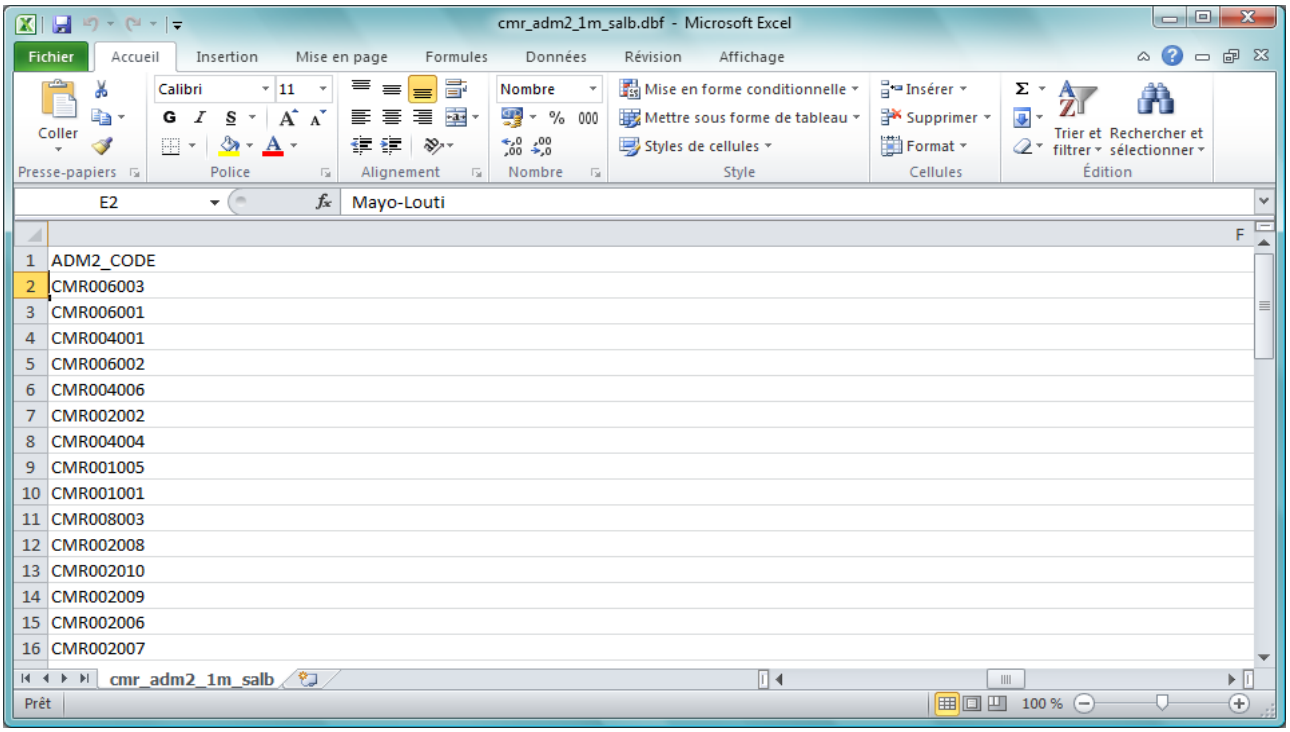






- Retrieve field values and IDs in the attribute table of your initial shapefile (.dbf which also opened with Excel):


cmr_adm2_1m_salb.dbf - Microsoft Excel
Fichier
Accueil
Insertion
Mise en page
Formules
Données
Révision
Affichage
Coller
Presse-papiers
Calibri
11
Police
Alignement
Nombre
Mise en forme conditionnelle
Mettre sous forme de tableau
Styles de cellules
Style
Insérer
Supprimer
Format
Cellules
Trier et filtrer
Rechercher et sélectionner
Édition
E2
Mayo-Louti
E
ADM2_NAME
Mayo-Louti
Benoue
Diamare
Faro
Mayo-Tsanaga
Lekie
Mayo-Kani
Vina
Djerem
Hauts-Plateaux
Nyong-et-Kelle
Nyong-et-Soo
Nyong-et-Mfoumou
Mefou-et-Akono
Mfoundi
cmr_adm2_1m_salb
Prêt
100 %


cmr_adm2_1m_salb.dbf - Microsoft Excel
Fichier
Accueil
Insertion
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Rechercher et sélectionner
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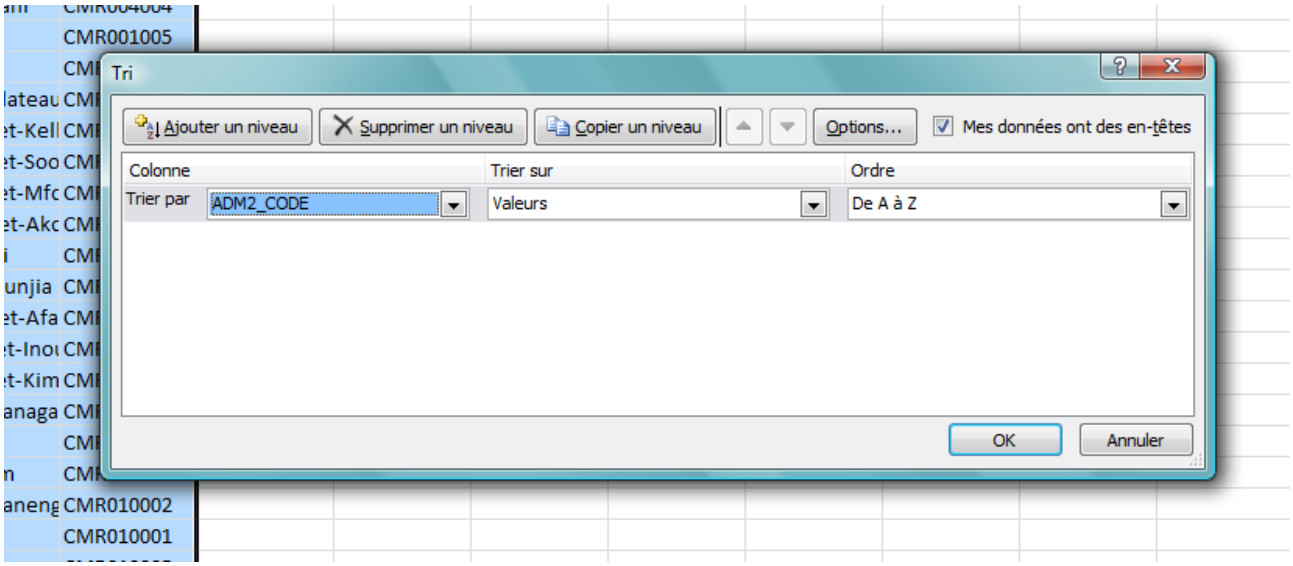
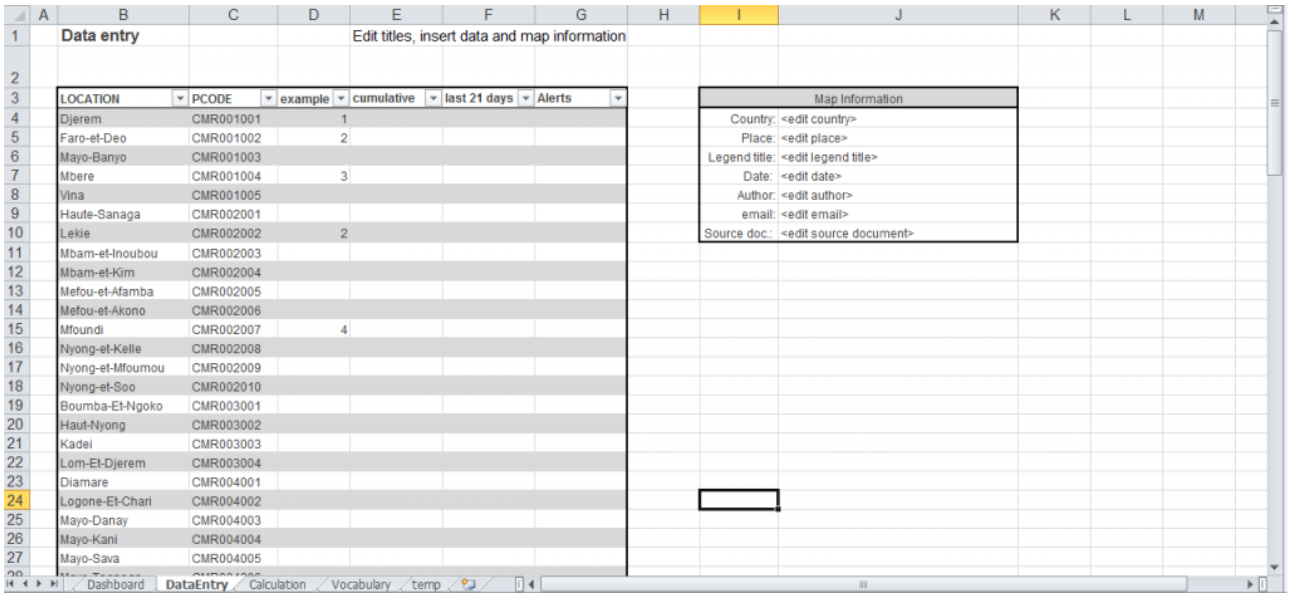
CMR006002
CMR004006
CMR002002
CMR004004
CMR001005
CMR001001
CMR008003
CMR002008
CMR002010
CMR002009
CMR002006
CMR002007
cmr_adm2_1m_salb
Prêt
100 %

Copy/paste in a temporary worksheet then sort them alphabetically or by PCODE:



Don't mix the PCODES by sorting them!

- **Copy/Paste values** for zones and IDs in Location and PCODE rows of Data entry, Calculation and Vocabulary worksheets:



R	G	B	Color
255	255	255	sample color
255	255	0	sample color
255	165	0	sample color
255	69	0	sample color
255	0	0	sample color
128	0	0	sample color

DO NOT ADD MORE ROWS TO THIS TABLE

LOCATION	PCODE
Djerem	CMR001001
Faro-et-Deo	CMR001002
Mayo-Banyo	CMR001003
Mbere	CMR001004
Vina	CMR001005
Haute-Sanaga	CMR002001
Lekie	CMR002002
Mbam-et-Inoubou	CMR002003
Mbam-et-Kim	CMR002004
Mefou-et-Afamba	CMR002005
Mefou-et-Akono	CMR002006
Mfoundi	CMR002007
Nyong-et-Kelle	CMR002008
Nyong-et-Mfoumou	CMR002009
Nyong-et-Soo	CMR002010
Boumba-Et-Ngoko	CMR003001
Haut-Nyong	CMR003002
Kadei	CMR003003
Lom-Et-Djerem	CMR003004
Diamare	CMR004001
Logone-Et-Chari	CMR004002
Mayo-Danay	CMR004003
Mayo-Kani	CMR004004
Mayo-Sava	CMR004005
Mayo-Tsanaga	CMR004006
Moungo	CMR005001
Nkam	CMR005002
Sanaga-Maritime	CMR005003

Dashboard / DataEntry / Calculation / Vocabulary / temp

Keep always this column the latest one of the table

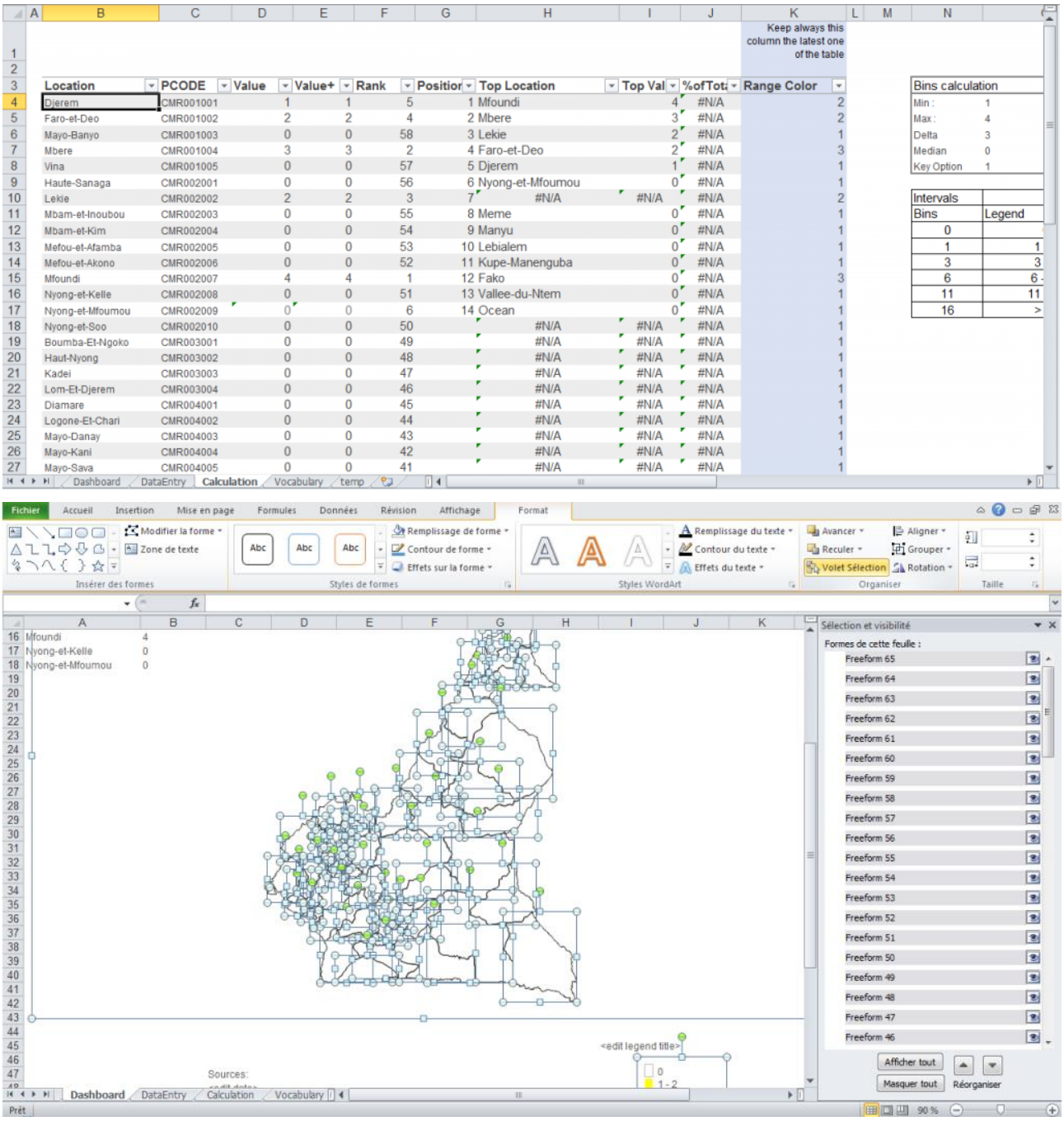
Location	PCODE	Value	Value+	Rank	Position	Top Location	Top Val	%ofTot	Range Color
Djerem	CMR001001	1	1	5	1	Mfoundi	4	#N/A	2
Faro-et-Deo	CMR001002	2	2	4	2	Mbere	3	#N/A	2
Mayo-Banyo	CMR001003	0	0	58	3	Lekie	2	#N/A	1
Mbere	CMR001004	3	3	2	4	Faro-et-Deo	2	#N/A	3
Vina	CMR001005	0	0	57	5	Djerem	1	#N/A	1
Haute-Sanaga	CMR002001	0	0	56	6	Nyong-et-Mfoumou	0	#N/A	1
Lekie	CMR002002	2	2	3	7	#N/A	#N/A	#N/A	2
Mbam-et-Inoubou	CMR002003	0	0	55	8	Meme	0	#N/A	1
Mbam-et-Kim	CMR002004	0	0	54	9	Manyu	0	#N/A	1
Mefou-et-Afamba	CMR002005	0	0	53	10	Lebialem	0	#N/A	1
Mefou-et-Akono	CMR002006	0	0	52	11	Kupe-Manenguba	0	#N/A	1
Mfoundi	CMR002007	4	4	1	12	Fako	0	#N/A	3
Nyong-et-Kelle	CMR002008	0	0	51	13	Vallee-du-Ntem	0	#N/A	1
Nyong-et-Mfoumou	CMR002009	0	0	6	14	Ocean	0	#N/A	1
Nyong-et-Soo	CMR002010	0	0	50		#N/A	#N/A	#N/A	1
Boumba-Et-Ngoko	CMR003001	0	0	49		#N/A	#N/A	#N/A	1
Haut-Nyong	CMR003002	0	0	48		#N/A	#N/A	#N/A	1
Kadei	CMR003003	0	0	47		#N/A	#N/A	#N/A	1
Lom-Et-Djerem	CMR003004	0	0	46		#N/A	#N/A	#N/A	1
Diamare	CMR004001	0	0	45		#N/A	#N/A	#N/A	1
Logone-Et-Chari	CMR004002	0	0	44		#N/A	#N/A	#N/A	1
Mayo-Danay	CMR004003	0	0	43		#N/A	#N/A	#N/A	1
Mayo-Kani	CMR004004	0	0	42		#N/A	#N/A	#N/A	1
Mayo-Sava	CMR004005	0	0	41		#N/A	#N/A	#N/A	1

Bins calculation	
Min :	1
Max :	4
Delta	3
Median	0
Key Option	1

Intervals	
Bins	Legend
0	
1	1
3	3
6	6 -
11	11
16	>

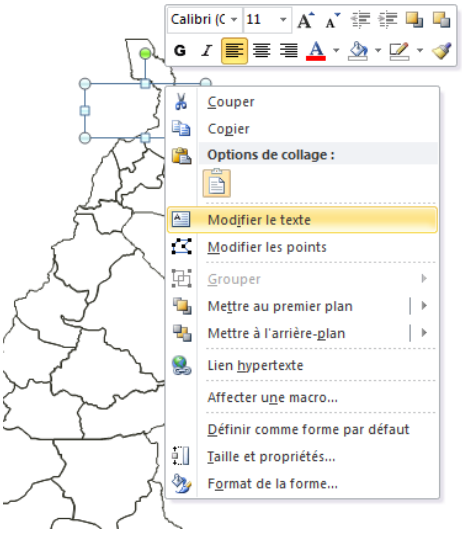
Dashboard / DataEntry / Calculation / Vocabulary / temp

- If the number of rows of your new *Location* array exceeds the total number of rows of existing array, copy/paste the formula of previous lines on the *Dashboard* worksheet (Link to *Location* array in *Calculation* worksheet). Do the same on the *Value* column.
- If the number of lines of your new *Location* array is less than the total number of rows of existing array, clear the excess cells on the Dashboard worksheet (Link to Location array in Calculation worksheet)). Do the same on the Value column.
- Record the PCODES for each Freeform. Define a name for each Freeform (use your initial attribute table) using the following format: PCODE_1. In this example, CMR004002_1 for Logone et Chari. To determine the name of each Freeform, select a shape, go to Format/Selection pane. In the opened window, double click on the name of the Freeform, then rename it and press Enter. Use the **hide/Unhide** symbol to check then do the same for the next one.

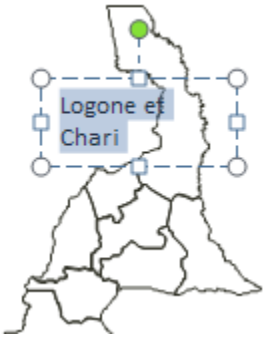


Note: If you forget to press Enter, your new name will not be recorded!

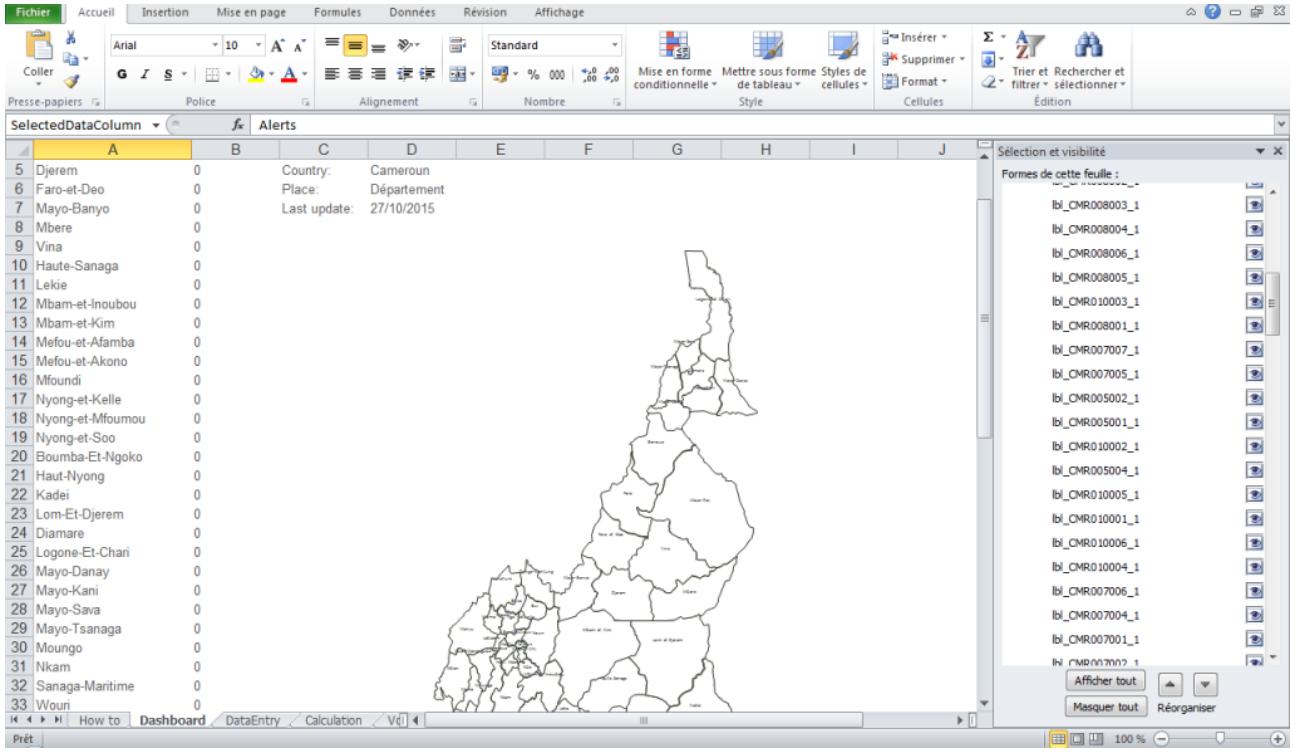
- Create a label for each Freeform. **Insert/Shape,** select a rectangle then in the drawing tools (click on the shape) Format/shape fill/no fill; Shape Outline/No Outline. **Right click on the shape** then **Modify text** to rename your text:



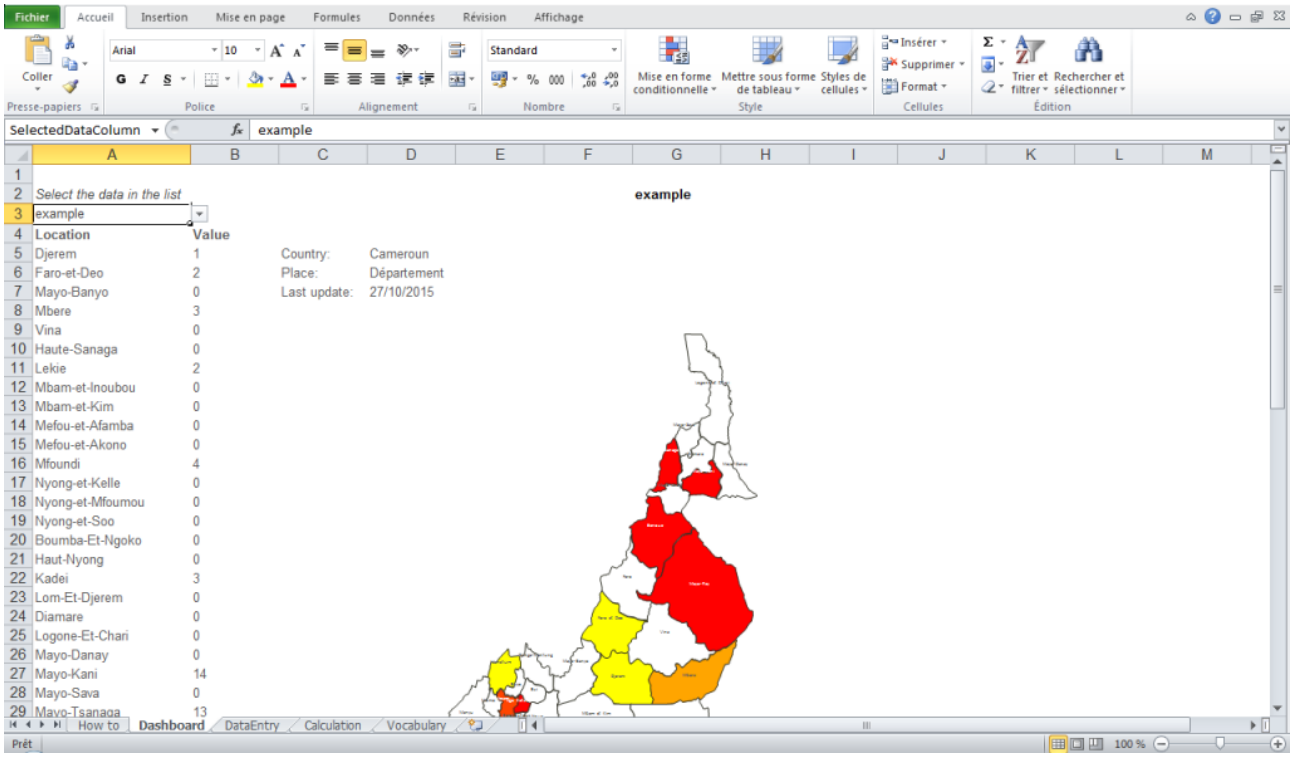
- Define a name for each label using the following format: lbl_PCODE_1 (using one ID for each Freeform).
- To determine the name of each label, select a label (or a shape) , go to Format / Selection pane. In the opened window, click the label name, rename it and press Enter:



Use the same way to rename all the shapes:



- Fill your map information in Data entry worksheet.
- Hide *Calculation* and *Vocabulary* worksheets.
- Save the document.
- The VBA script, present in the template will assign the color which corresponds to the defined values:



Your choropleth map is now ready! MSF Headers and logos are saved in the Excel workbook, you just need to print your map.

V. If you need to change the values intervals

1. Display the Calculation work sheet**.**

2. Modify the values in *Bin* column of the *intervals* array and modify the Legend from Legend column.

3. Hide *Calculation* worksheet.

4. Save the document.

Be sure that the Values Inputs in the legend match with the desired values!

VI. To go forward…

This method can be binding on a map with a large number of entities due to manual recording shapes and labels. However, you can visit the following links for more information:

http://www.hypergeo.eu/spip.php?article274

http://robbiecwilson.hubpages.com/hub/How-to-create-a-thematic-or-Choropleth-map-in-Excel-2007-and-Excel-2010

http://www.clearlyandsimply.com/clearly_and_simply/2009/08/build-your-own-choropleth-maps-with-excel.html

http://www.tushar-mehta.com/publish_train/xl_vba_cases/0301-dashboard-conditional_shape_colors.htm