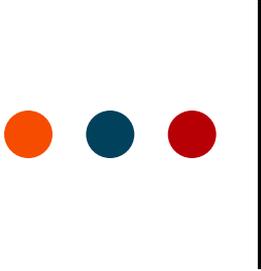




The Future Tropical Forest Ecosystem



The Future Tropical Rainforest

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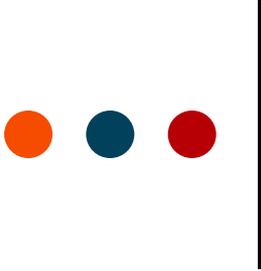
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Objectives

To gain a greater appreciation of the level and rate of deforestation in tropical rainforest areas

To be able to produce a map of spatial data using a GIS package

To describe and explain the relationship between deforestation and other variables



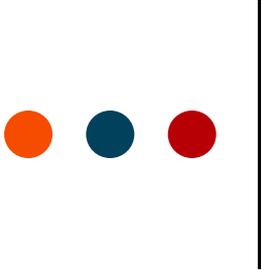
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**How many countries the size of England
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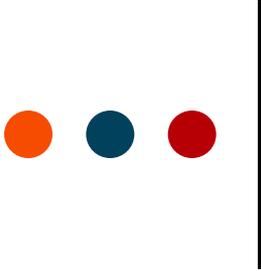
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= 6 countries the size of England



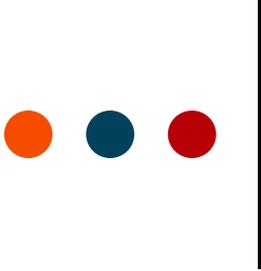
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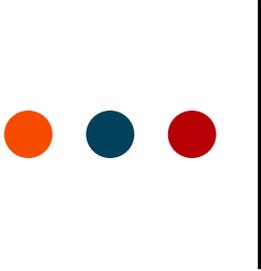
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7,989 km² of tropical rainforest was lost from the
Brazilian Amazon in 2016

= 1,248,281 football pitches



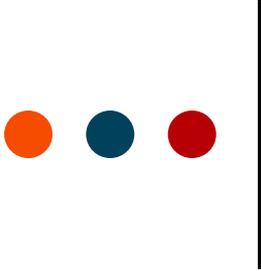
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Assuming deforestation was happening at the same pace, 24 hours a day and on every day of the year, how many football pitches are we losing every hour in the Brazilian Amazon alone?

**1,248,281
football pitches a
year**



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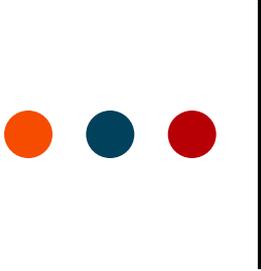
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Assuming deforestation was happening at the same pace, 24 hours a day and on every day of the year, how many football pitches are we losing every hour in the Brazilian Amazon alone?

**1,248,281
football pitches a
year**

**= 142
football pitches an
hour**

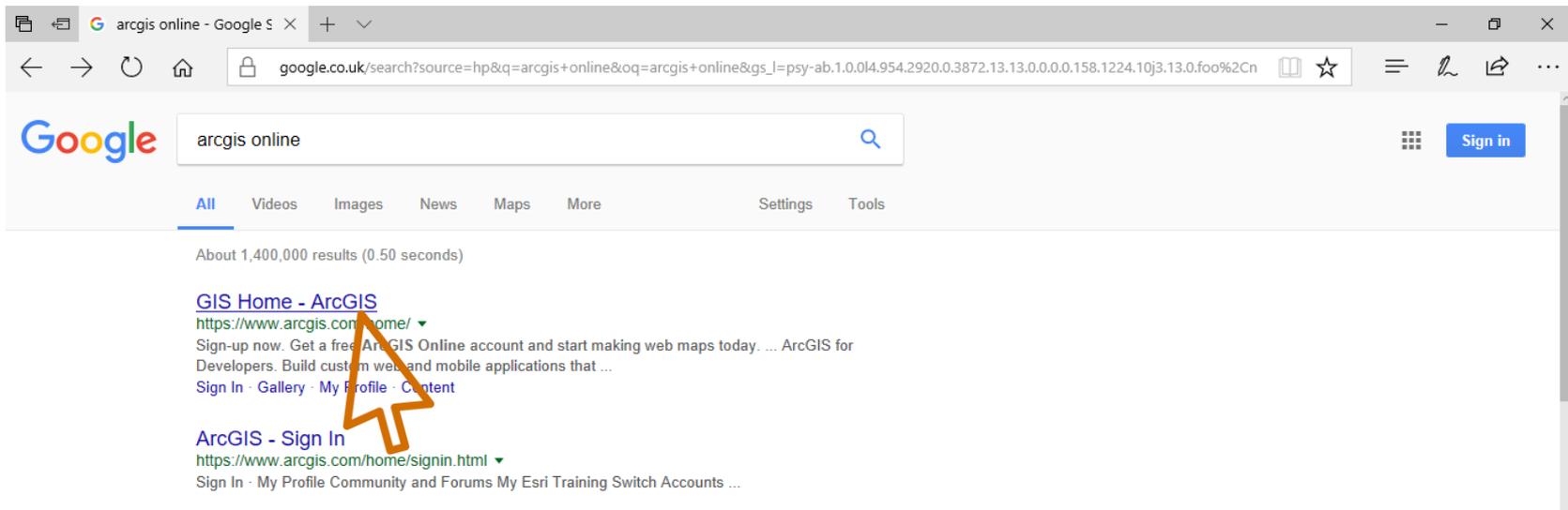


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Go onto **ArcGIS Online**:



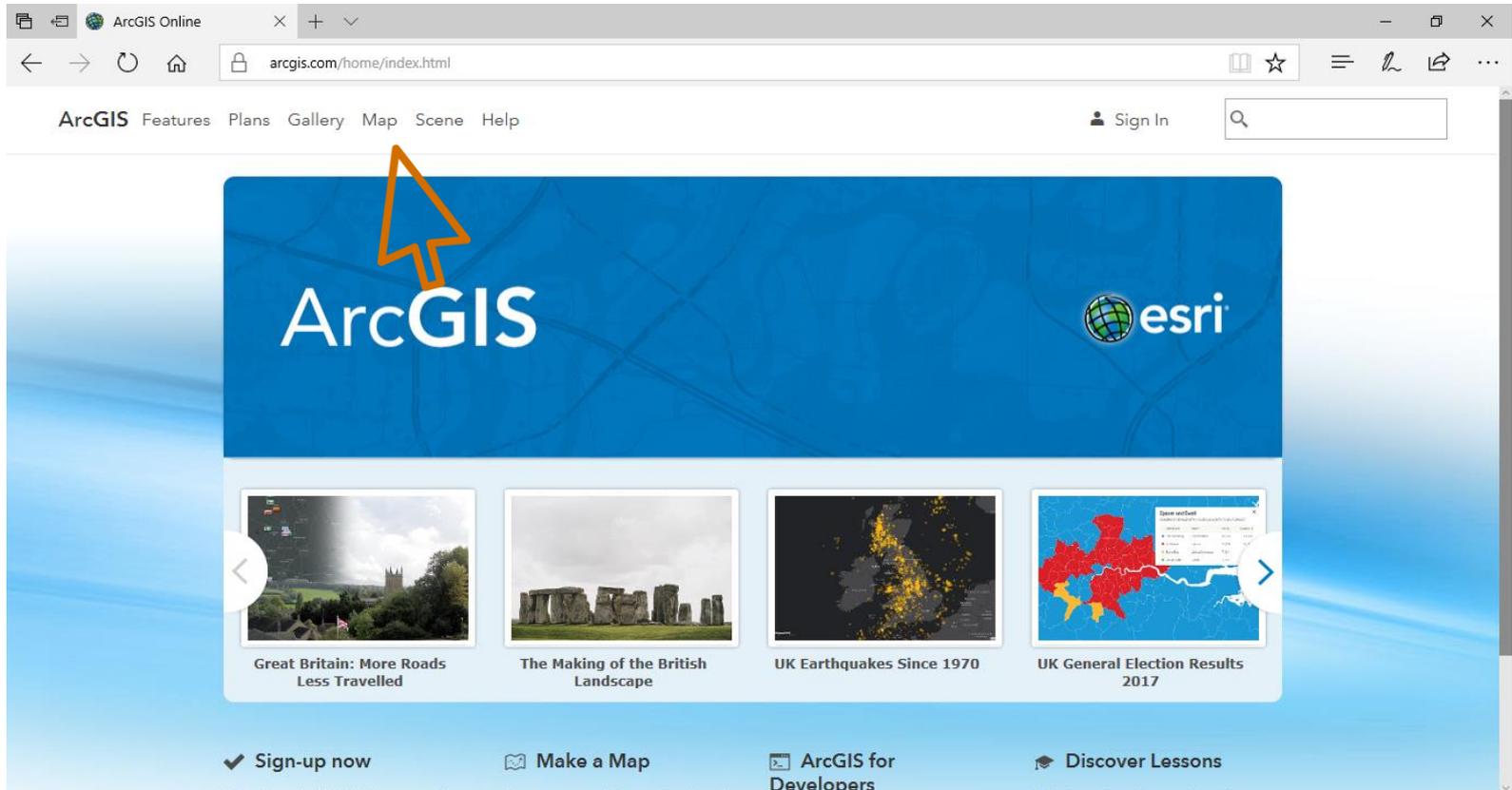
A screenshot of a Google search for "arcgis online". The search results show "About 1,400,000 results (0.50 seconds)". The top result is "GIS Home - ArcGIS" with the URL "https://www.arcgis.com/home/". Below the URL are links for "Sign In", "Gallery", "My Profile", and "Content". The second result is "ArcGIS - Sign In" with the URL "https://www.arcgis.com/home/signin.html". Below the URL are links for "Sign In", "My Profile", "Community and Forums", and "My Esri Training Switch Accounts ...". A red mouse cursor is pointing at the "Sign In" link in the first result.

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Select **'Map'** :



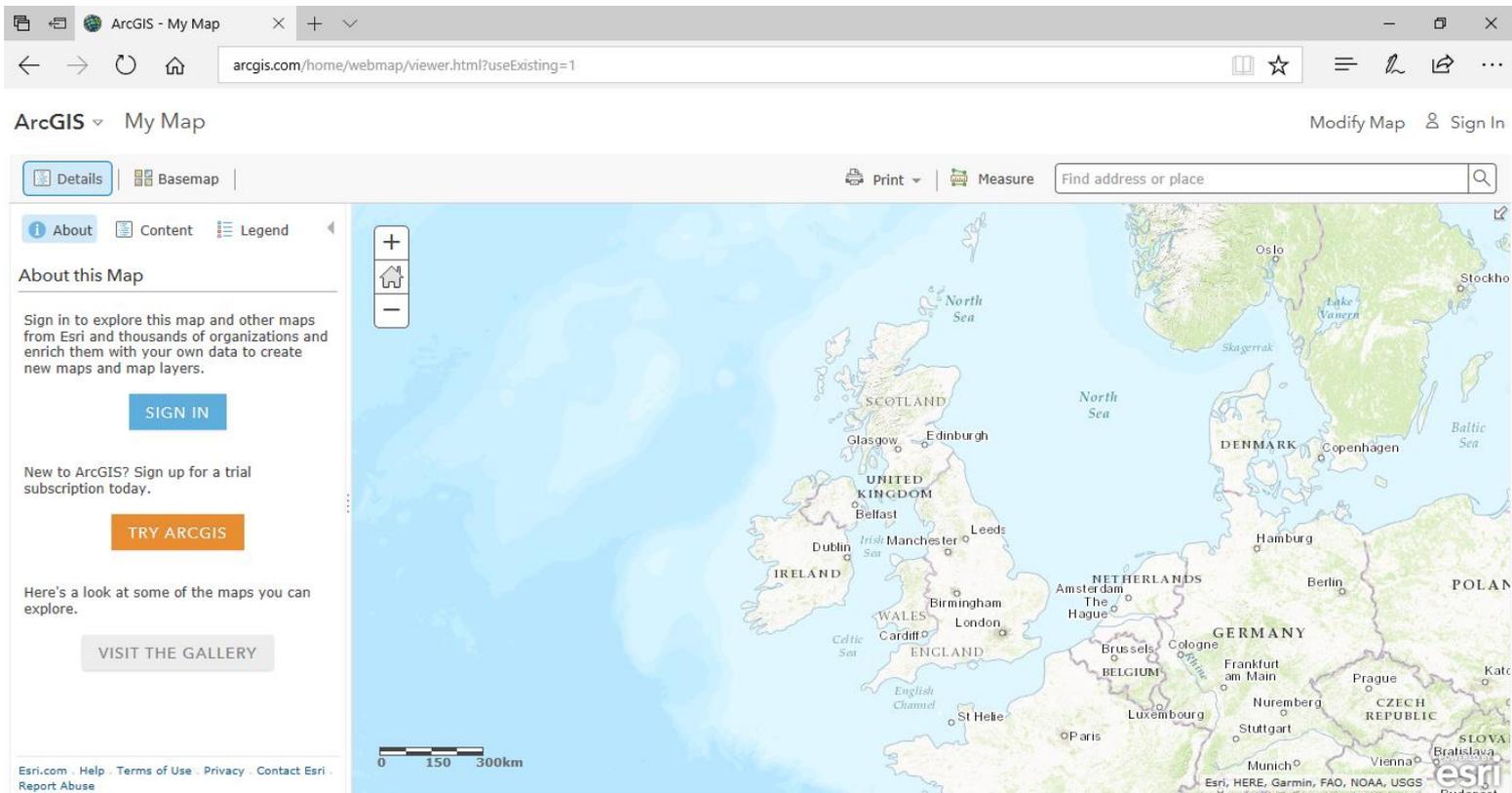
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Drag the **CSV data file** onto the map:



The screenshot shows the ArcGIS web interface. The browser address bar displays 'arcgis.com/home/webmap/viewer.html?useExisting=1'. The interface includes a search bar with the text 'Find address or place', a 'Print' button, and a 'Measure' button. The main map area shows a satellite-style map of Europe with labels for various countries and cities. The sidebar on the left contains a 'Details' tab, 'About', 'Content', and 'Legend' sections. The 'About this Map' section includes a 'SIGN IN' button and a 'TRY ARCGIS' button. A scale bar at the bottom of the map indicates 0, 150, and 300 km.



Brazilian
Amazon State
Statistics



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Zoom out to a level where you can see Brazil most clearly:

The screenshot shows the ArcGIS web interface. The browser address bar displays `arcgis.com/home/webmap/viewer.html?useExisting=1`. The map shows South America with various countries and states labeled, including Colombia, Ecuador, Peru, Brazil, Guyana, Suriname, and French Guiana. A style selection panel is open on the left, titled "Change Style" and "Brazilian Amazon State Statistics". It has two main steps: "1 Choose an attribute to show" with a dropdown menu set to "Show location only", and "2 Select a drawing style" with three options: "Location (Single symbol)" (selected with a checkmark), "Heat Map", and "Heat Map". The "Location (Single symbol)" option shows a map with orange dots. The "Heat Map" option shows a map with a color gradient from red to yellow. The panel has "DONE" and "CANCEL" buttons at the bottom. The map itself has a scale bar from 0 to 400 km and a search bar at the top right.

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Changing the **attributes** changes the data displayed:

The screenshot shows the ArcGIS web map interface. The browser address bar displays `arcgis.com/home/webmap/viewer.html?useExisting=1`. The map shows South America with various countries and cities labeled. A panel on the left titled "Change Style" is open, showing "Brazilian Amazon State Statistics". Under "1 Choose an attribute to show", a dropdown menu is set to "Show location only". Under "2", several attributes are listed: "Forest Loss (km2) (2016)", "GDP (R\$) (2014 est.)", "HDI (2010)", and "Population (2012)". A mouse cursor is pointing at the "Population (2012)" attribute. Below the list, there are "OPTIONS", "Heat Map", "SELECT", "DONE", and "CANCEL" buttons. The map includes a scale bar (0, 500, 1000km) and a search bar at the top right.

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Esri, HERE, Garmin, FAO, NOAA, USGS **esri**

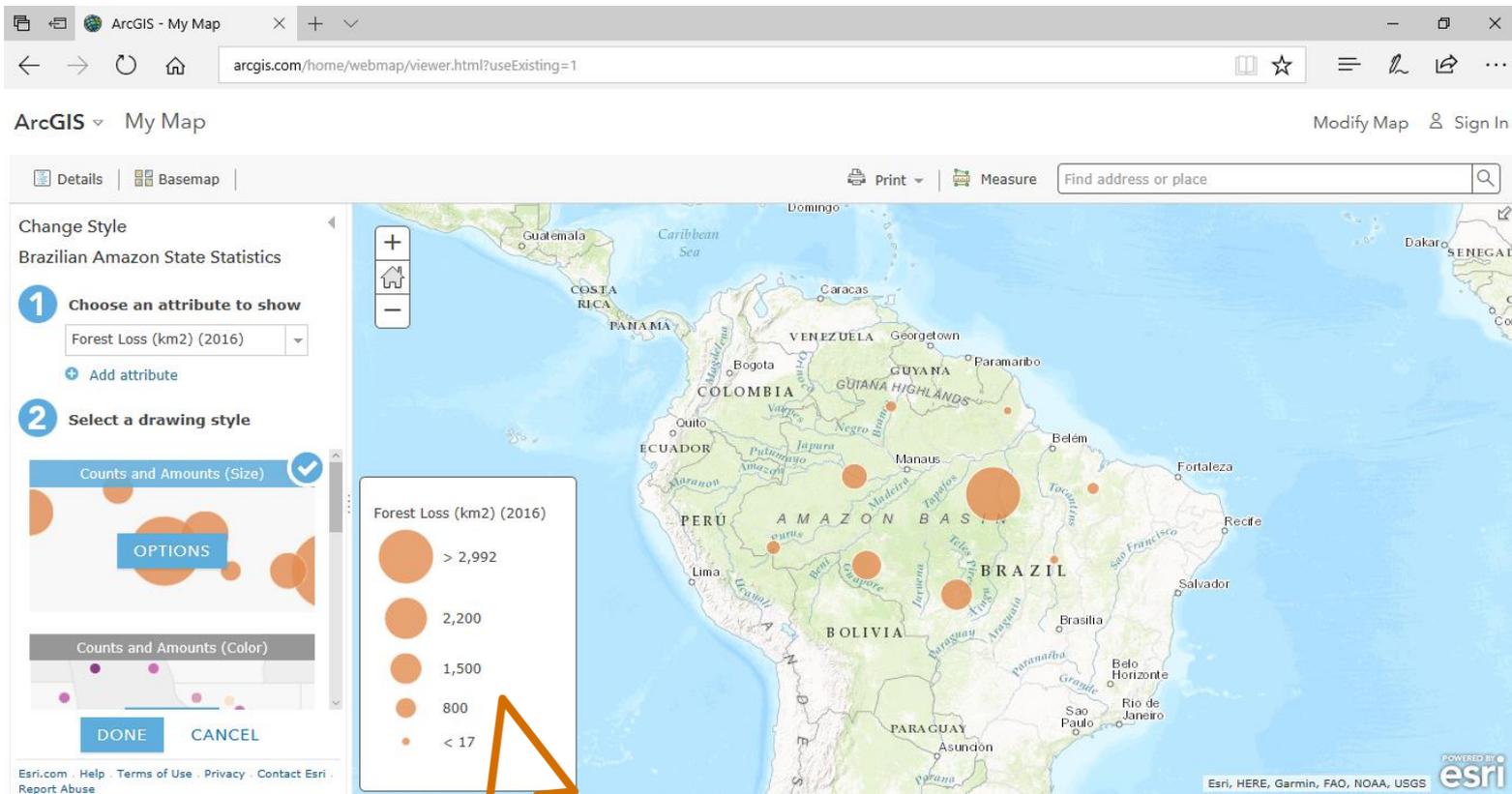
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The default presentation method is **proportional circles**:



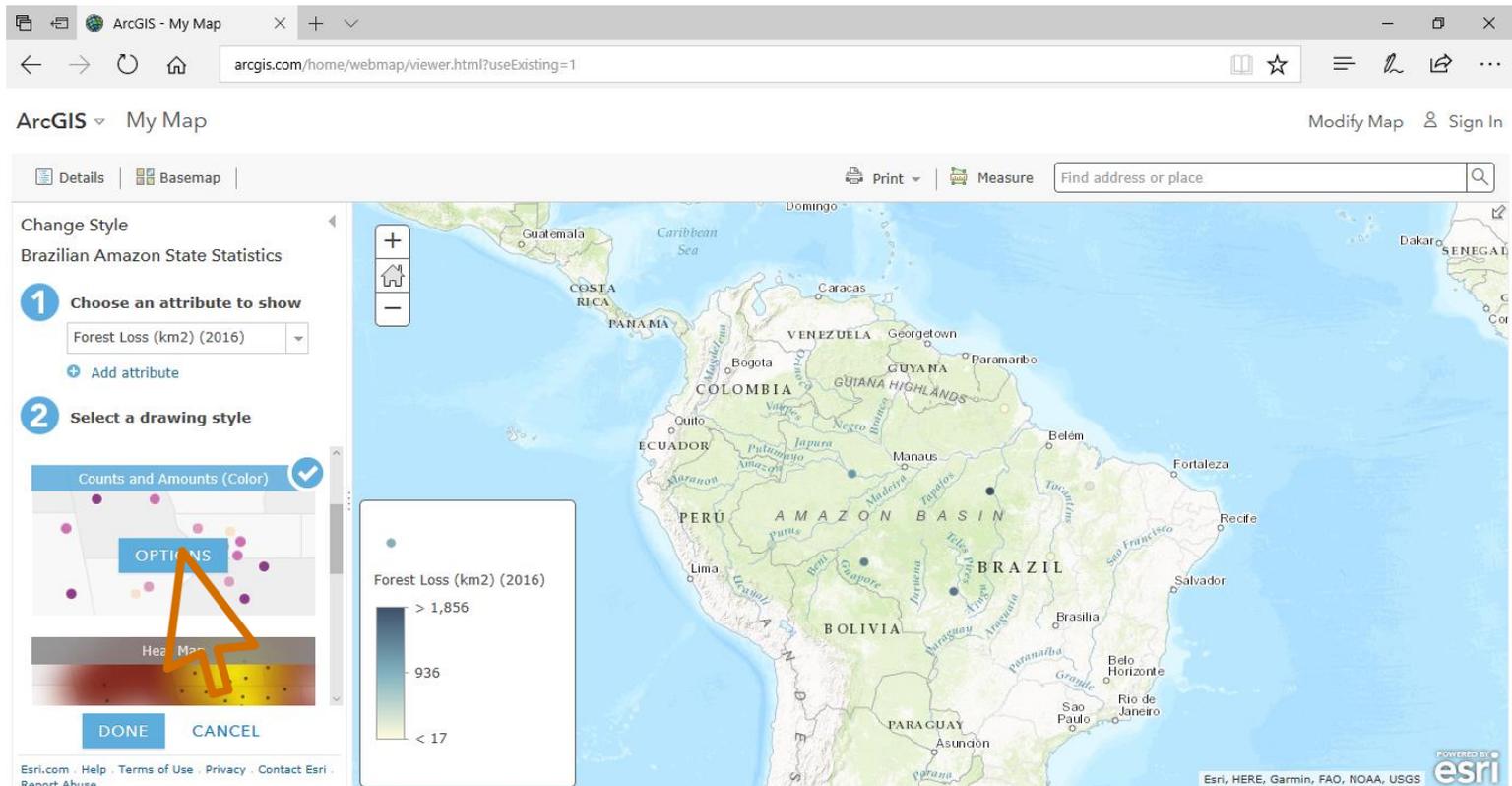
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Selecting **'Counts and Amounts (Color)'** changes the map to choropleth shaded dots:



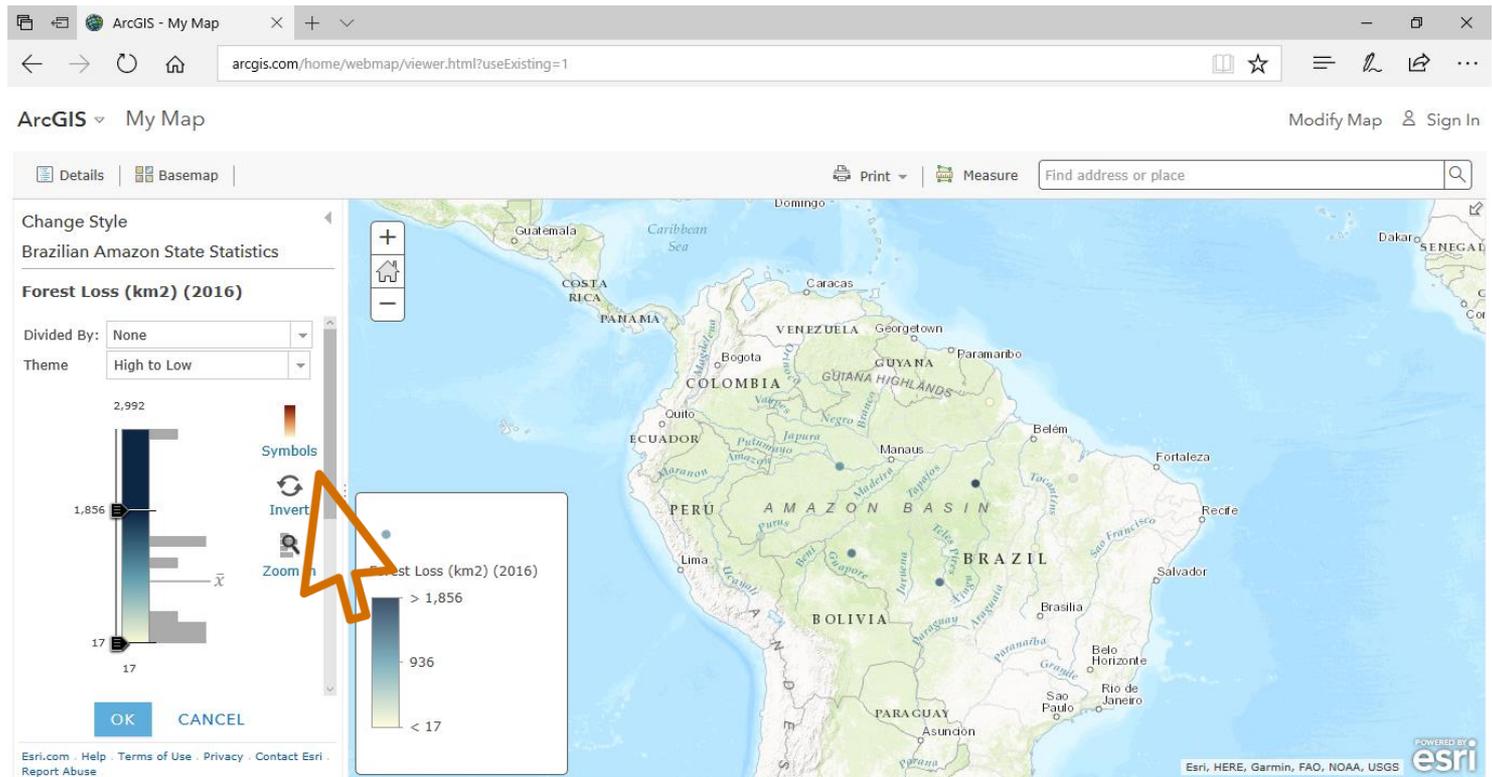
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Selecting **'Options'** and **'Symbols'** gives you the ability to change the size, shape and colour palette of the choropleth shapes:

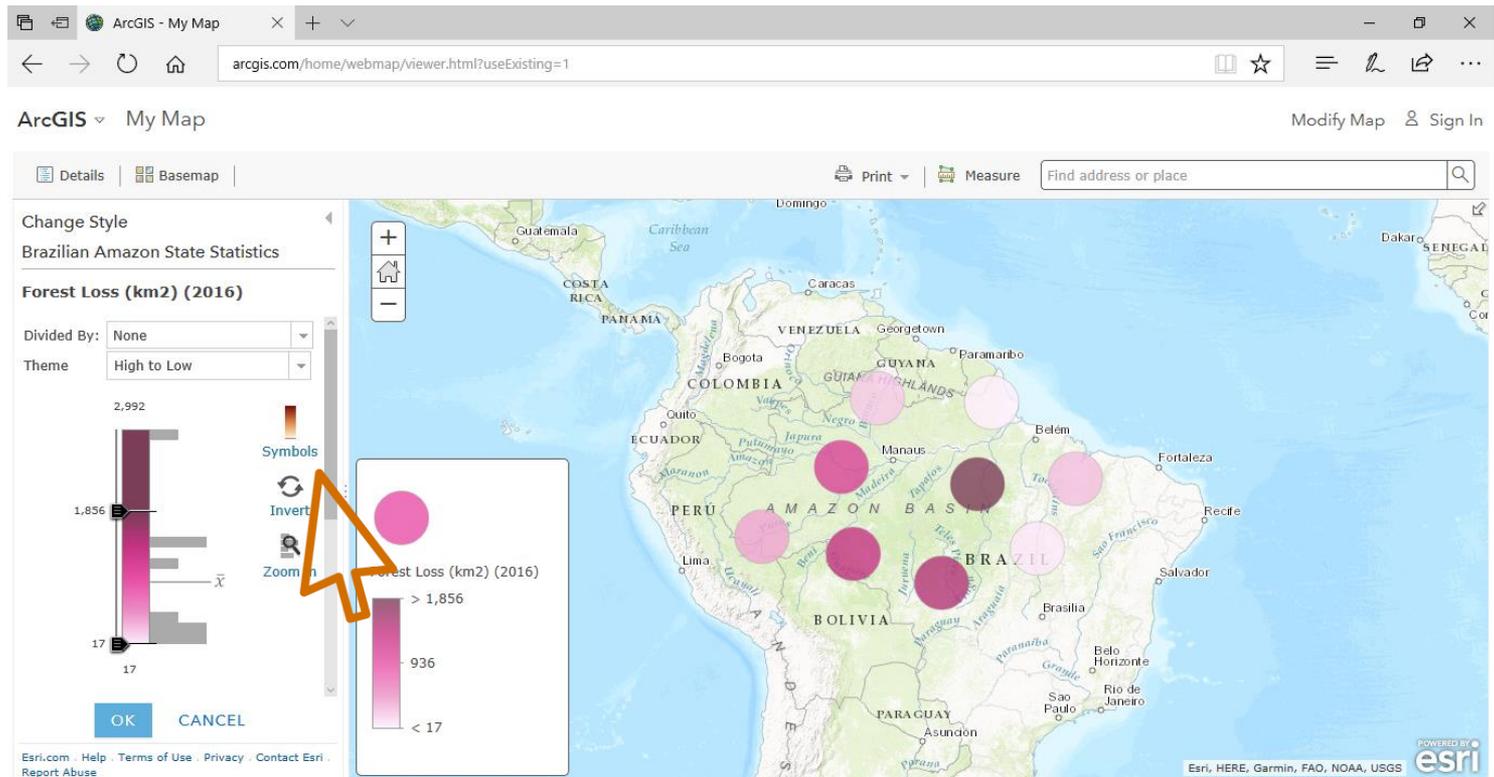


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Select **'Add attribute'** to compare more than one variable from the CSV file:

ArcGIS - My Map

arcgis.com/home/webmap/viewer.html?useExisting=1

ArcGIS My Map Modify Map Sign In

Details Basemap

Print Measure Find address or place

Change Style

Brazilian Amazon State Statistics

1 Choose an attribute to show

Forest Loss (km2) (2016)

+ Add attribute

2 Select a drawing style

Counts and Amounts (Color) [checked]

OPTIONS

Counts and Amounts (Size)

DONE CANCEL

Forest Loss (km2) (2016)

> 1,856

936

< 17

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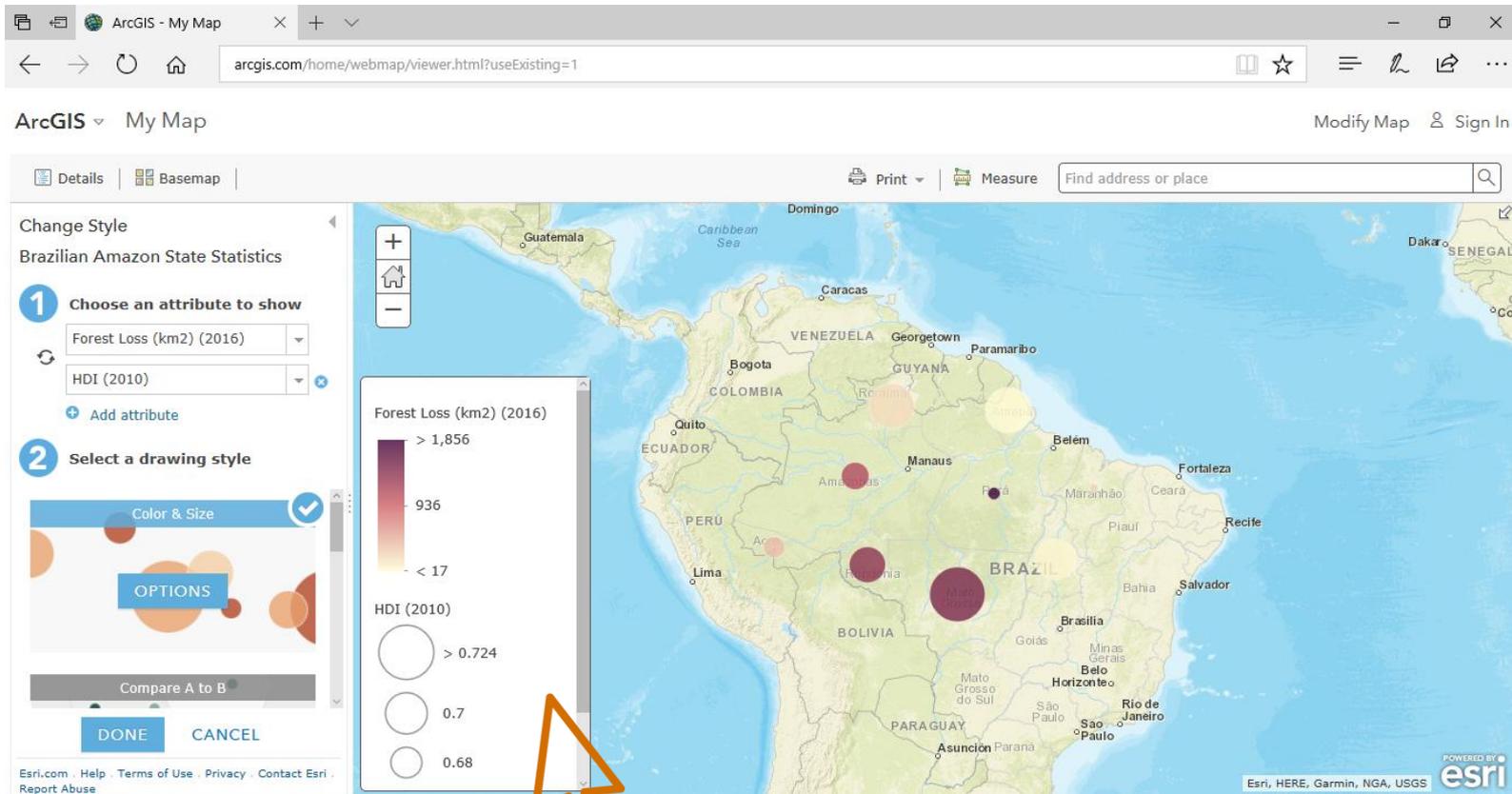
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In this case, size and colour represent the two different variables:



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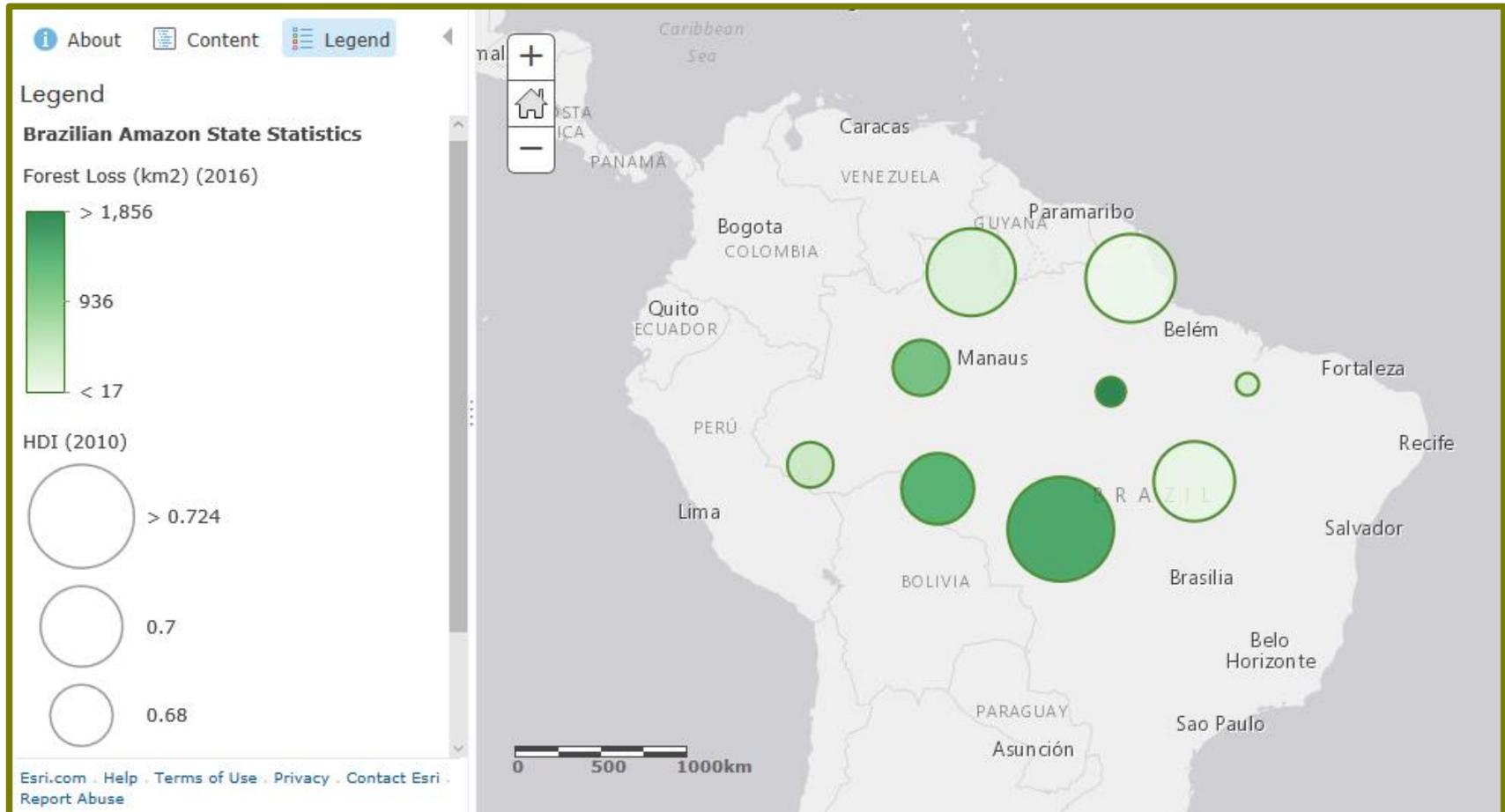
Experiment with changing the **basemap** to make the data stand out, as well as with scale, colour and attribute selected:



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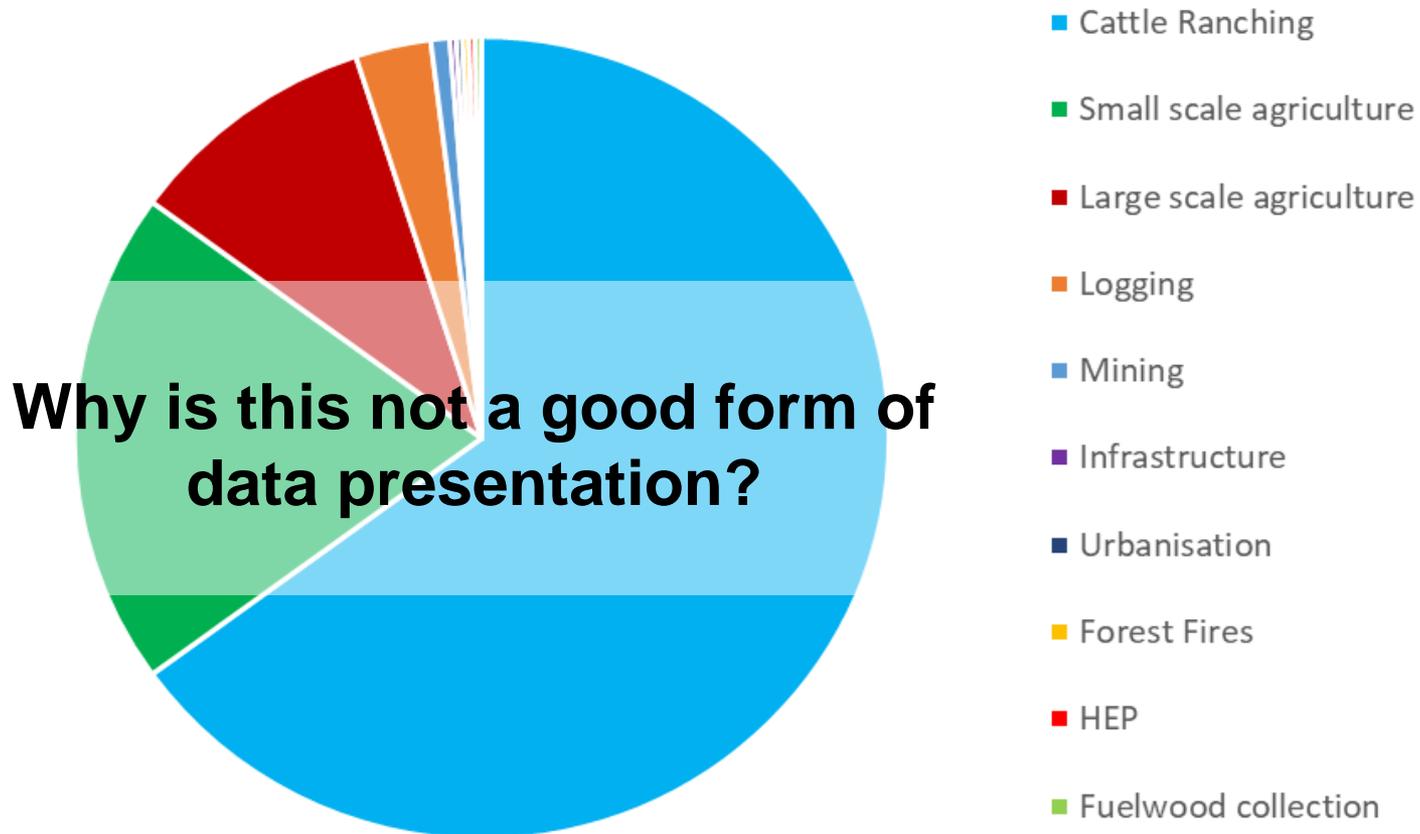
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Causes of deforestation in a Tropical Rainforest

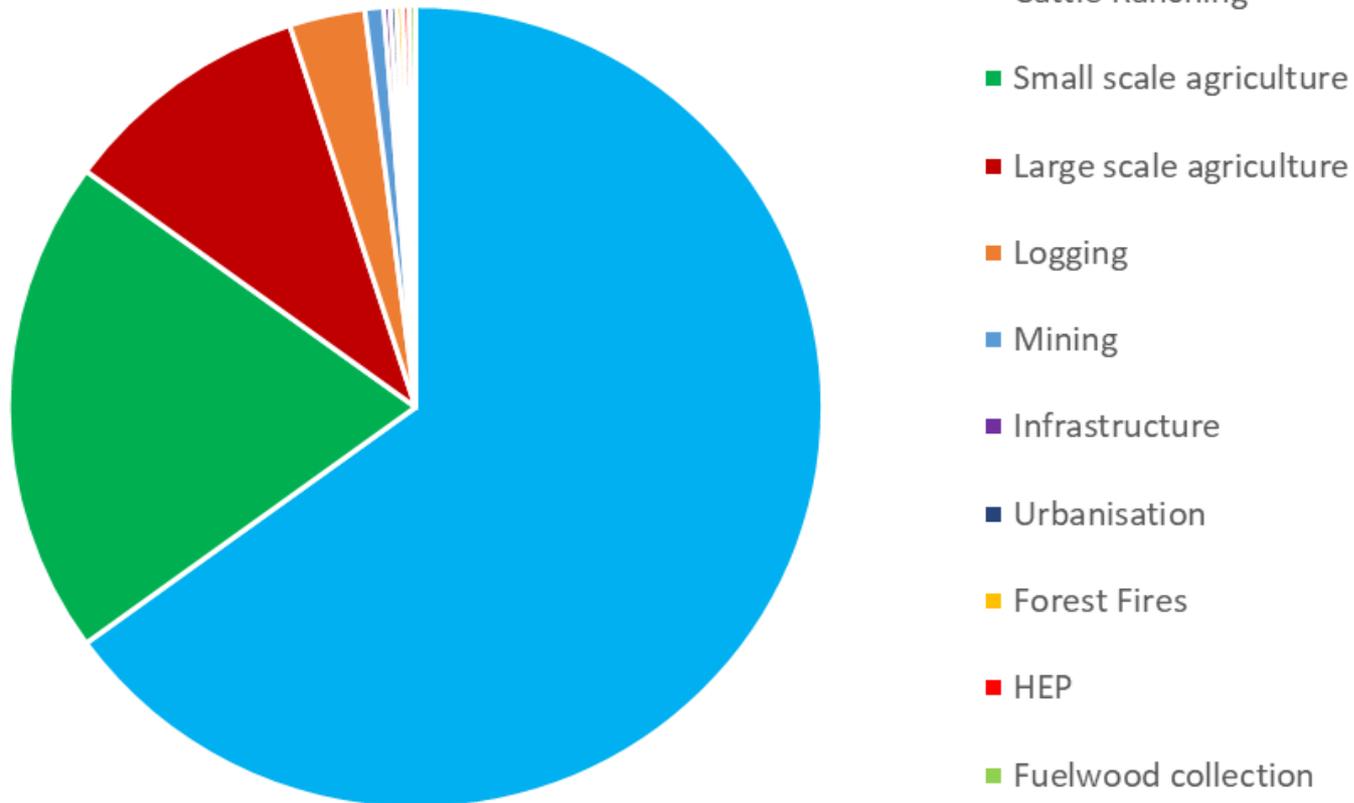


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Causes of deforestation in a Tropical Rainforest





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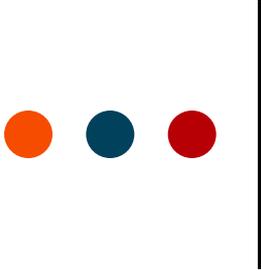
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Country	Area of forest cover (km ²)	Forest Cover	Loss as % of 2004 cover	Rate of deforestation change 2004 - 2014	Loss 2001-2014
Brazil	519,191,664	61.90%	4.90%	-6.00%	38,336,733
DR Congo	199,224,295	87.10%	3.20%	22.90%	7,977,010
Indonesia	160,978,096	85.80%	9.60%	2.40%	18,507,771
Colombia	81,779,083	72.60%	2.50%	-9.70%	2,822,694
Peru	78,069,516	60.90%	2.10%	16.40%	1,949,886
Bolivia	64,520,862	60.00%	4.20%	7.50%	3,394,108
Venezuela	56,531,450	62.80%	1.80%	-13.30%	1,376,709
Angola	55,315,474	44.40%	2.60%	19.40%	1,740,011
Mexico	53,182,952	27.40%	3.70%	-9.90%	2,587,661



Guess the Deforestation Rate



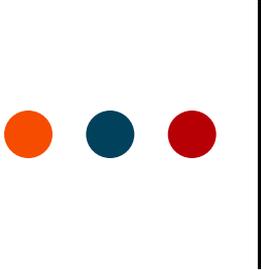
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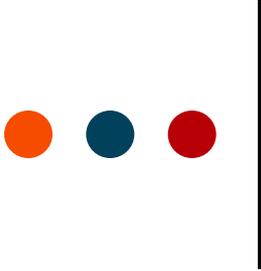
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= 6 countries the size of England



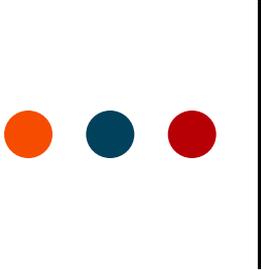
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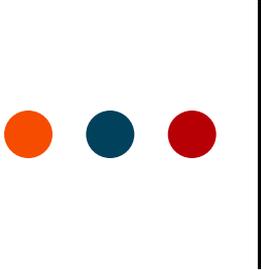
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7,989 km² of tropical rainforest was lost from the
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= 1,248,281 football pitches



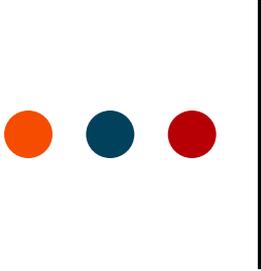
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Assuming deforestation was happening at the same pace, 24 hours a day and on every day of the year, how many football pitches are we losing every hour in the Brazilian Amazon alone?

**1,248,281
football pitches a
year**



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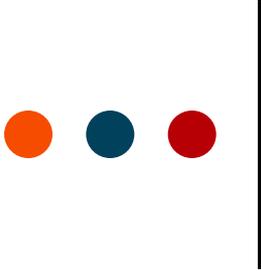
**= 142
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ArcGIS Data Presentation Guide

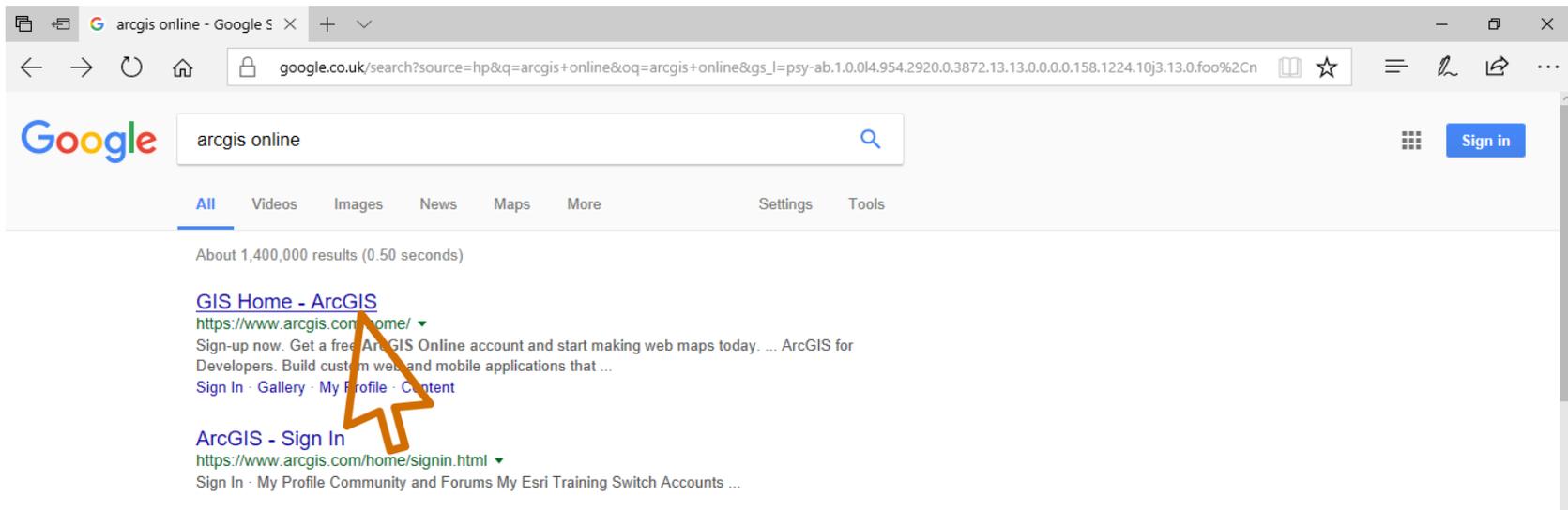


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Go onto **ArcGIS Online**:



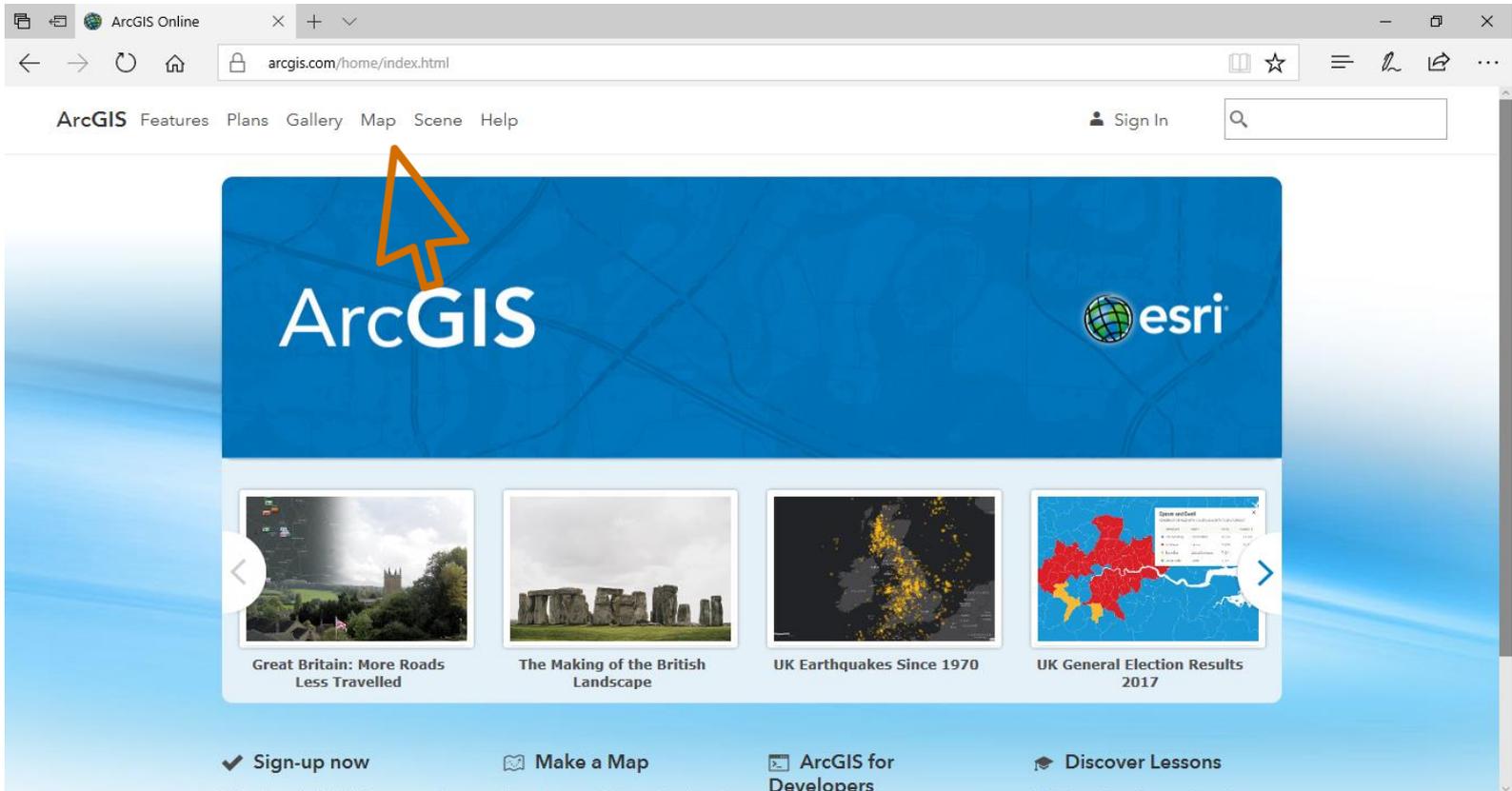
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Select **'Map'** :



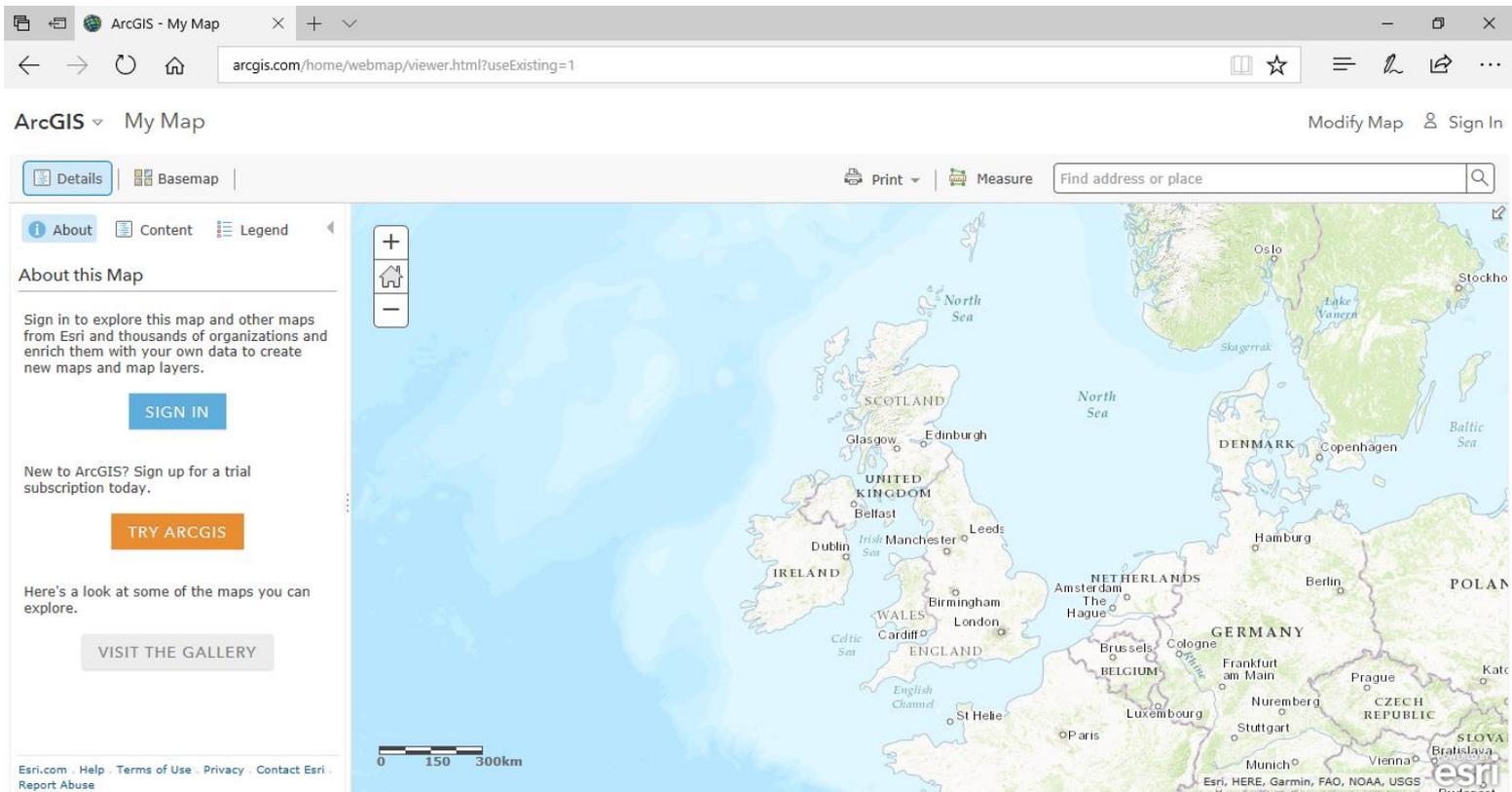
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Drag the **CSV data file** onto the map:



ArcGIS - My Map

arcgis.com/home/webmap/viewer.html?useExisting=1

ArcGIS ▾ My Map

Details | Basemap

Print | Measure Find address or place

About | Content | Legend

About this Map

Sign in to explore this map and other maps from Esri and thousands of organizations and enrich them with your own data to create new maps and map layers.

[SIGN IN](#)

New to ArcGIS? Sign up for a trial subscription today.

[TRY ARCGIS](#)

Here's a look at some of the maps you can explore.

[VISIT THE GALLERY](#)

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0 150 300km

esri

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Zoom out to a level where you can see Brazil most clearly:

The screenshot shows the ArcGIS web interface. The browser address bar displays 'arcgis.com/home/webmap/viewer.html?useExisting=1'. The map shows South America with various countries and states labeled, including Colombia, Ecuador, Peru, Brazil, Guyana, Suriname, and French Guiana. A style selection panel is open on the left, titled 'Change Style' and 'Brazilian Amazon State Statistics'. It has two main steps: '1 Choose an attribute to show' with a dropdown menu set to 'Show location only', and '2 Select a drawing style' with three options: 'Location (Single symbol)' (selected with a checkmark), 'Heat Map', and 'Heat Map'. The 'Location (Single symbol)' option shows a map with orange dots. Below the options are 'DONE' and 'CANCEL' buttons. The map itself has a scale bar from 0 to 400 km and a search bar at the top right.

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Changing the **attributes** changes the data displayed:

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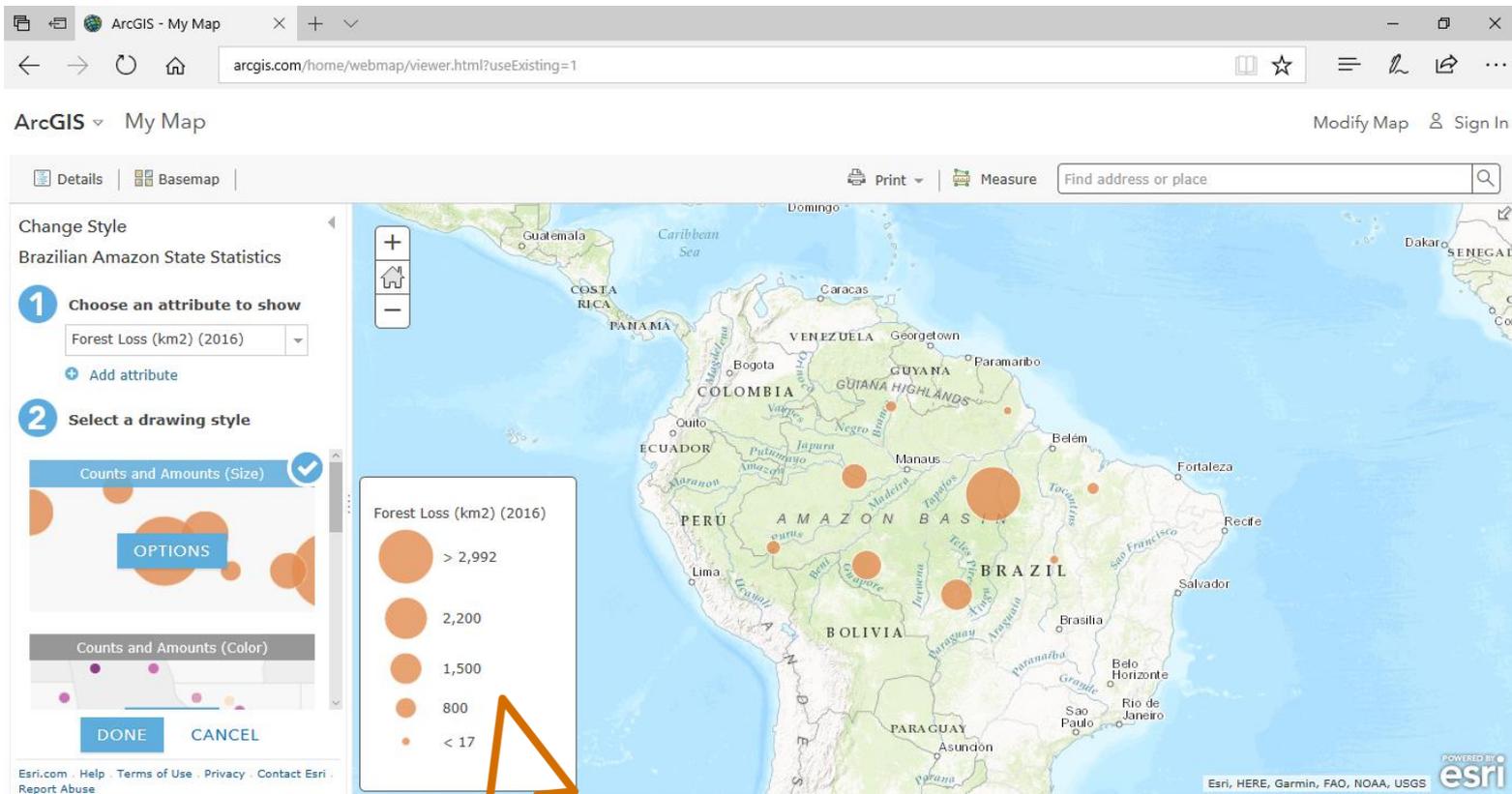
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The default presentation method is **proportional circles**:



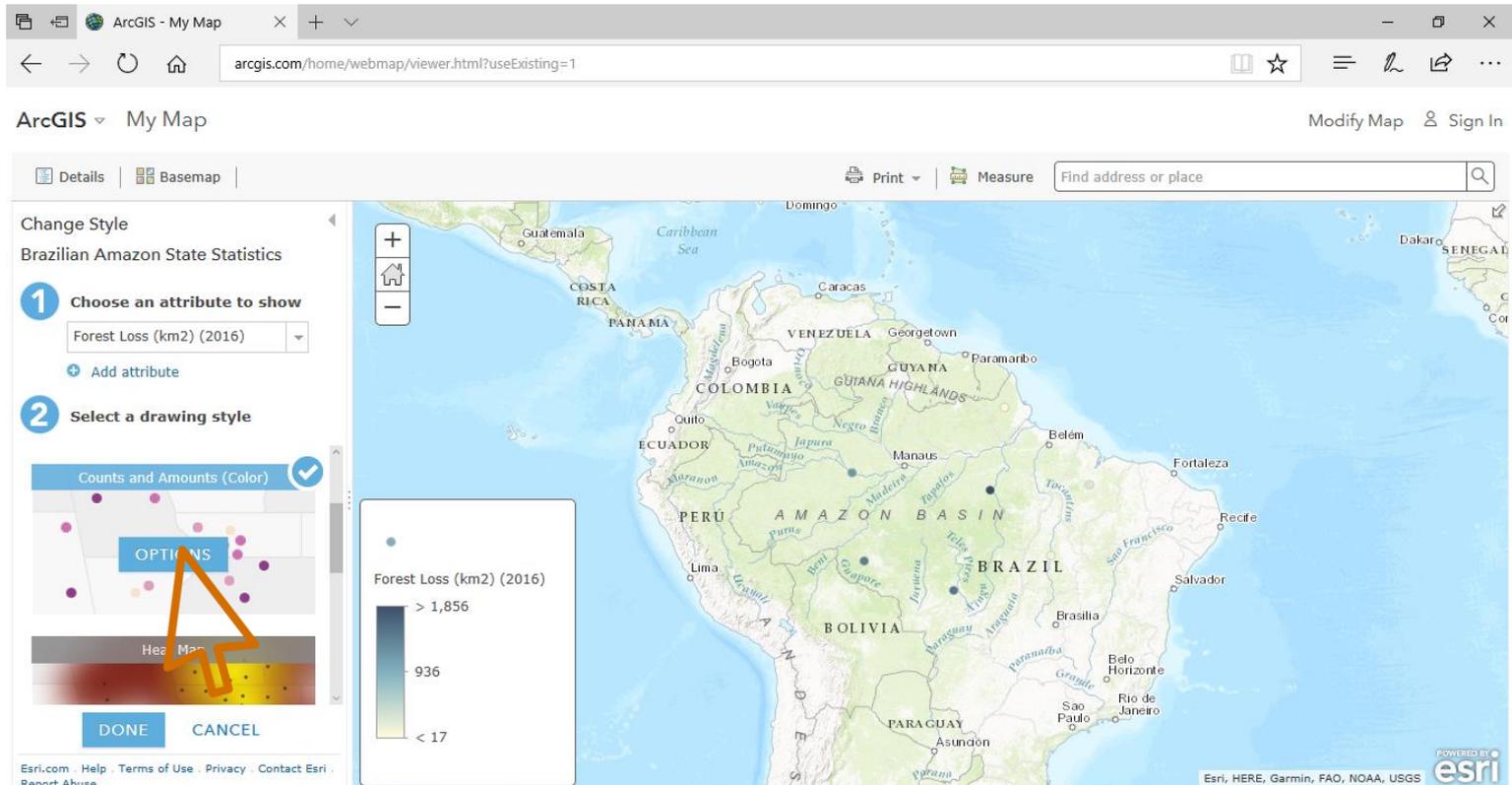
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Selecting **'Counts and Amounts (Color)'** changes the map to choropleth shaded dots:



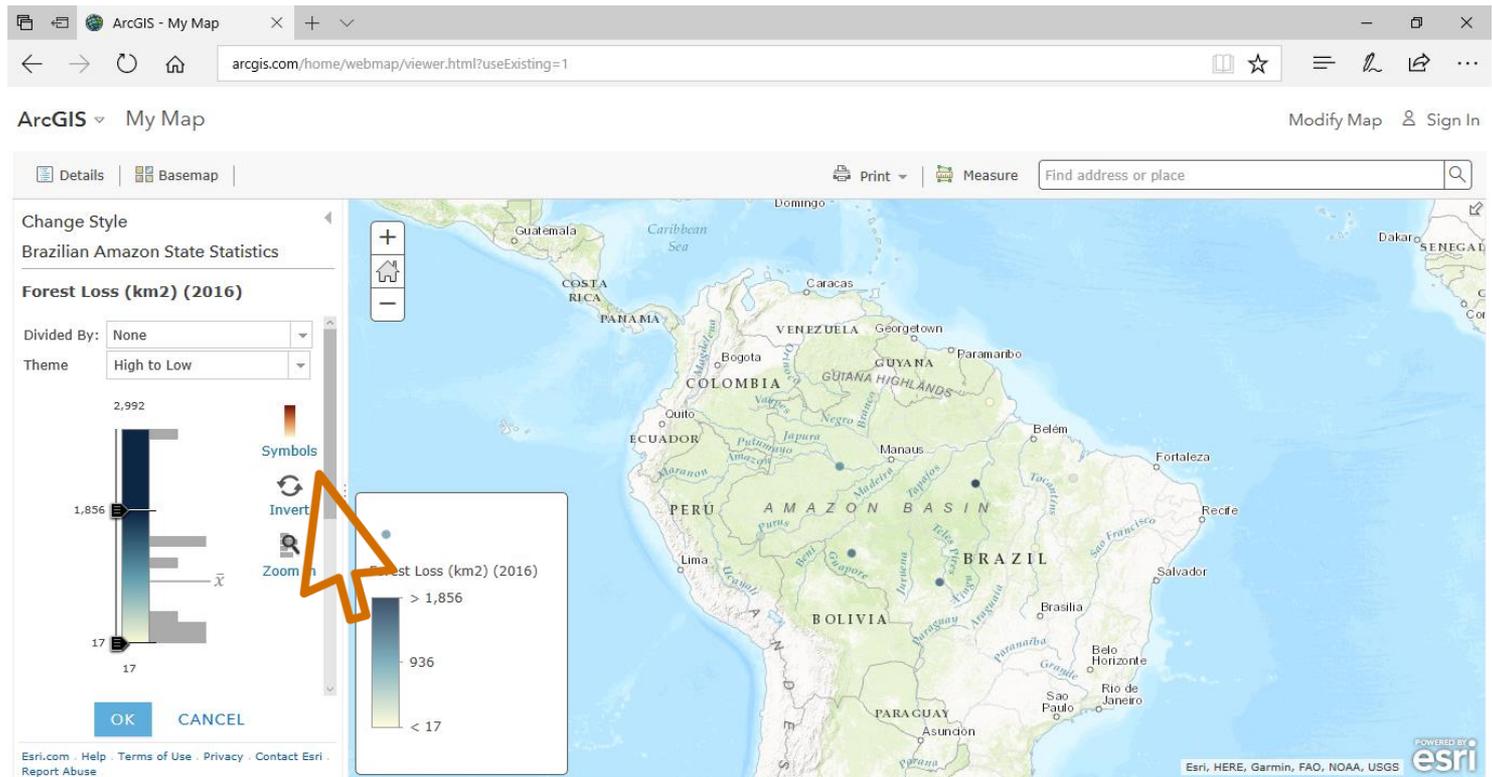
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Selecting **'Options'** and **'Symbols'** gives you the ability to change the size, shape and colour palette of the choropleth shapes:

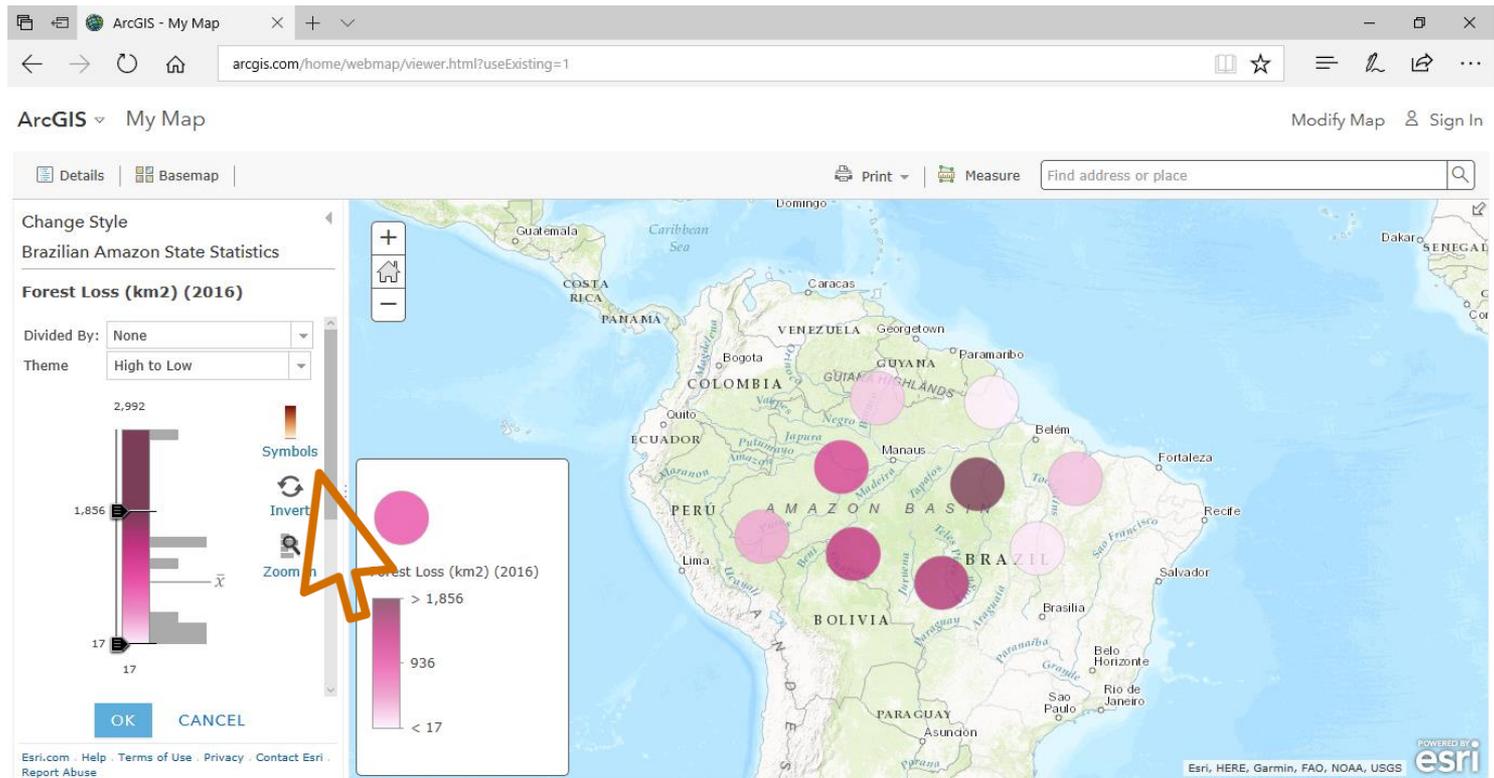


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Select **'Add attribute'** to compare more than one variable from the CSV file:

ArcGIS - My Map

arcgis.com/home/webmap/viewer.html?useExisting=1

ArcGIS My Map Modify Map Sign In

Details Basemap

Print Measure Find address or place

Change Style

Brazilian Amazon State Statistics

1 Choose an attribute to show

Forest Loss (km2) (2016)

+ Add attribute

2 Select a drawing style

Counts and Amounts (Color) [checked]

OPTIONS

Counts and Amounts (Size)

DONE CANCEL

Forest Loss (km2) (2016)

> 1,856

936

< 17

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POWERED BY esri

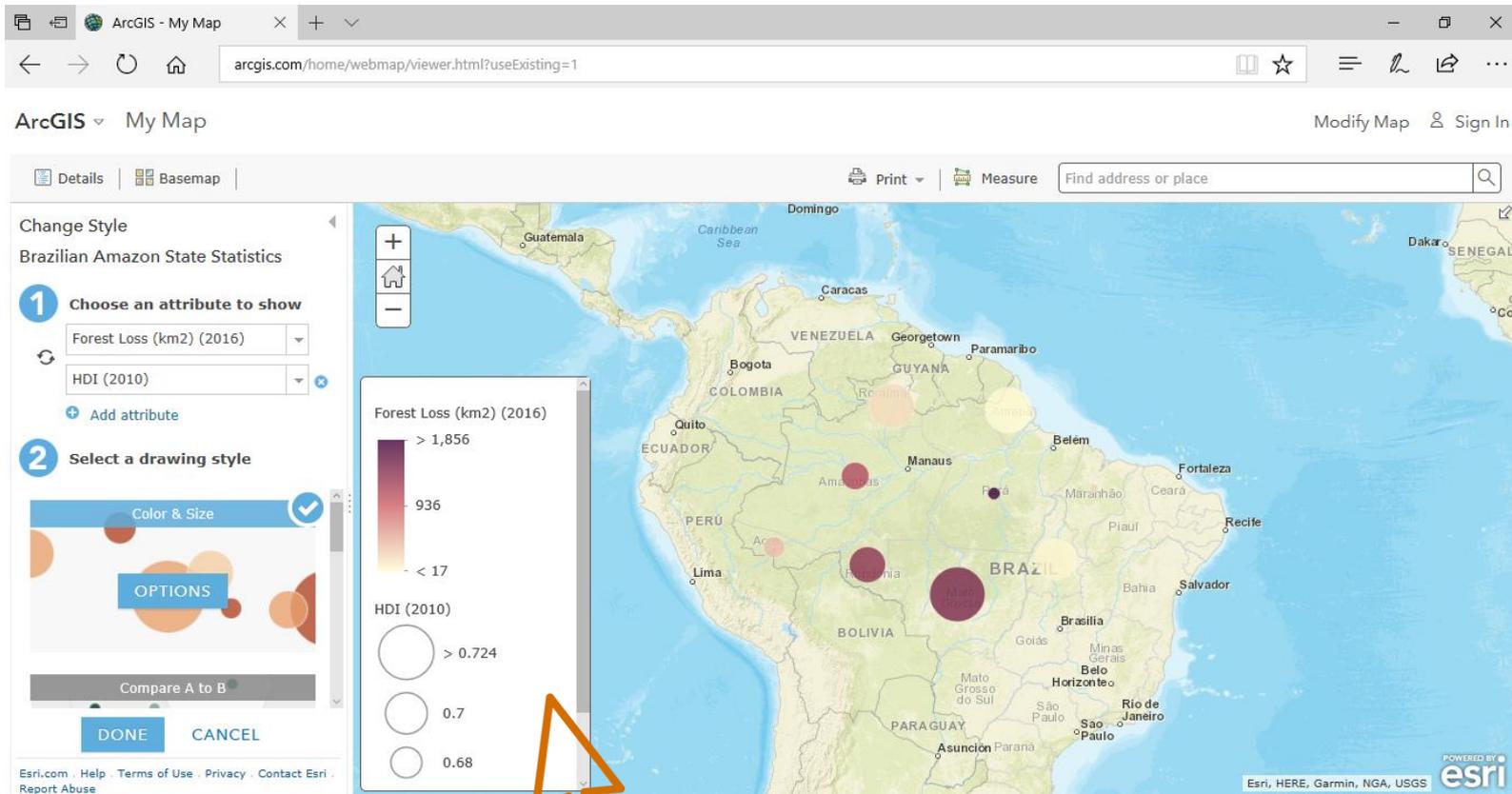
Esri, HERE, Garmin, FAO, NOAA, USGS

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In this case, size and colour represent the two different variables:



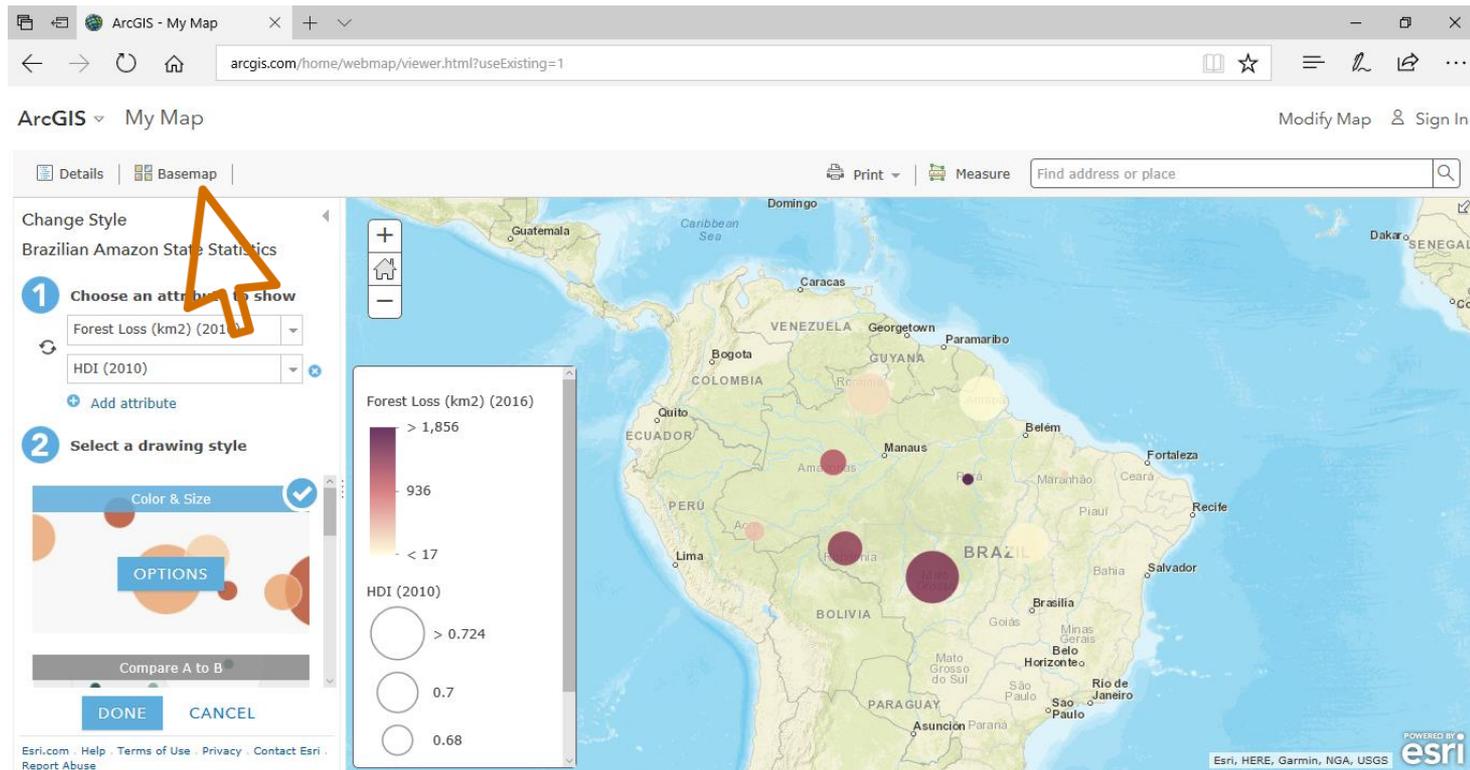
This project was funded by the Nuffield Foundation, but the views expressed are those of the authors and not necessarily those of the Foundation.

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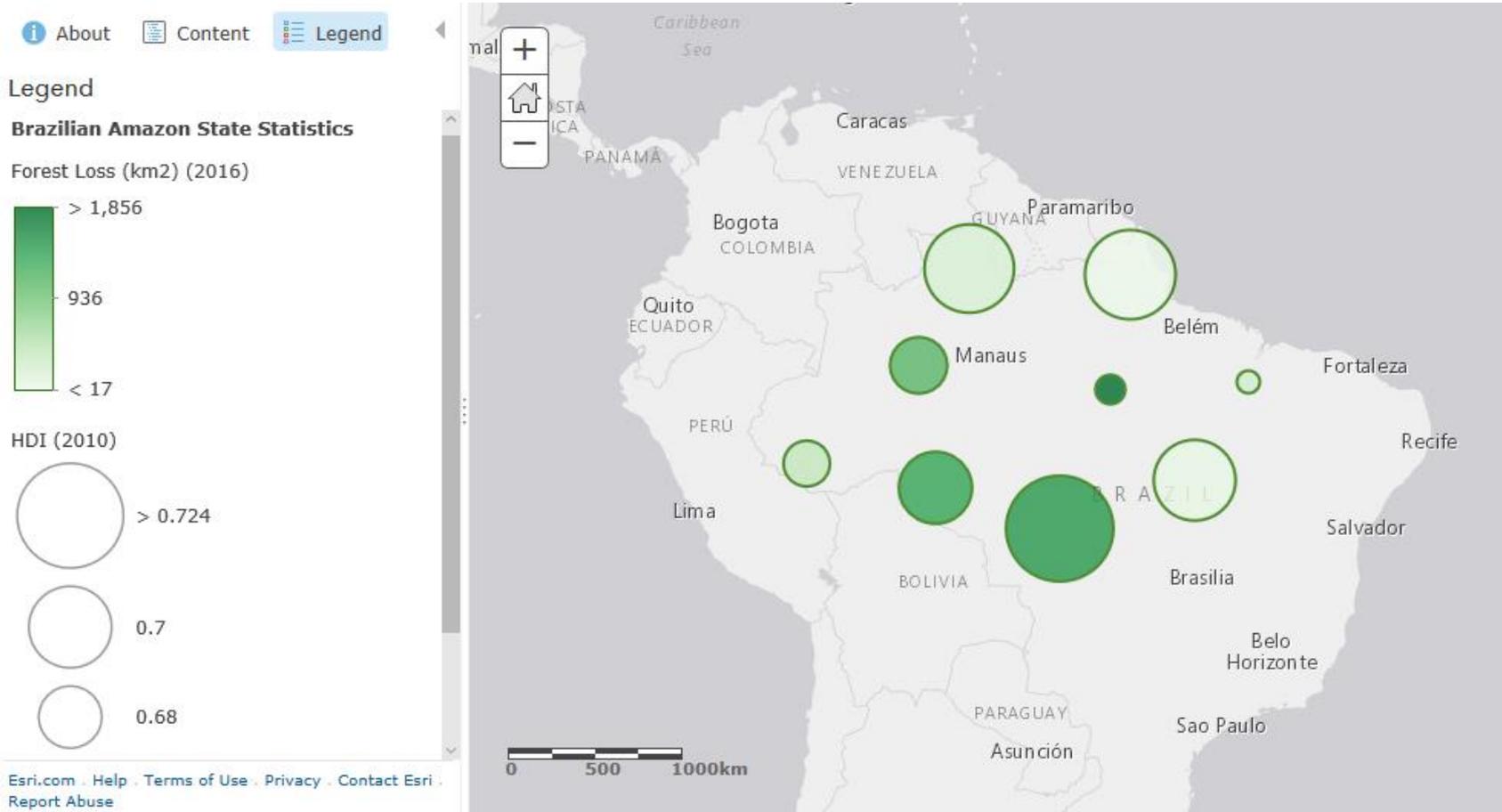
Experiment with changing the **basemap** to make the data stand out, as well as with scale, colour and attribute selected:



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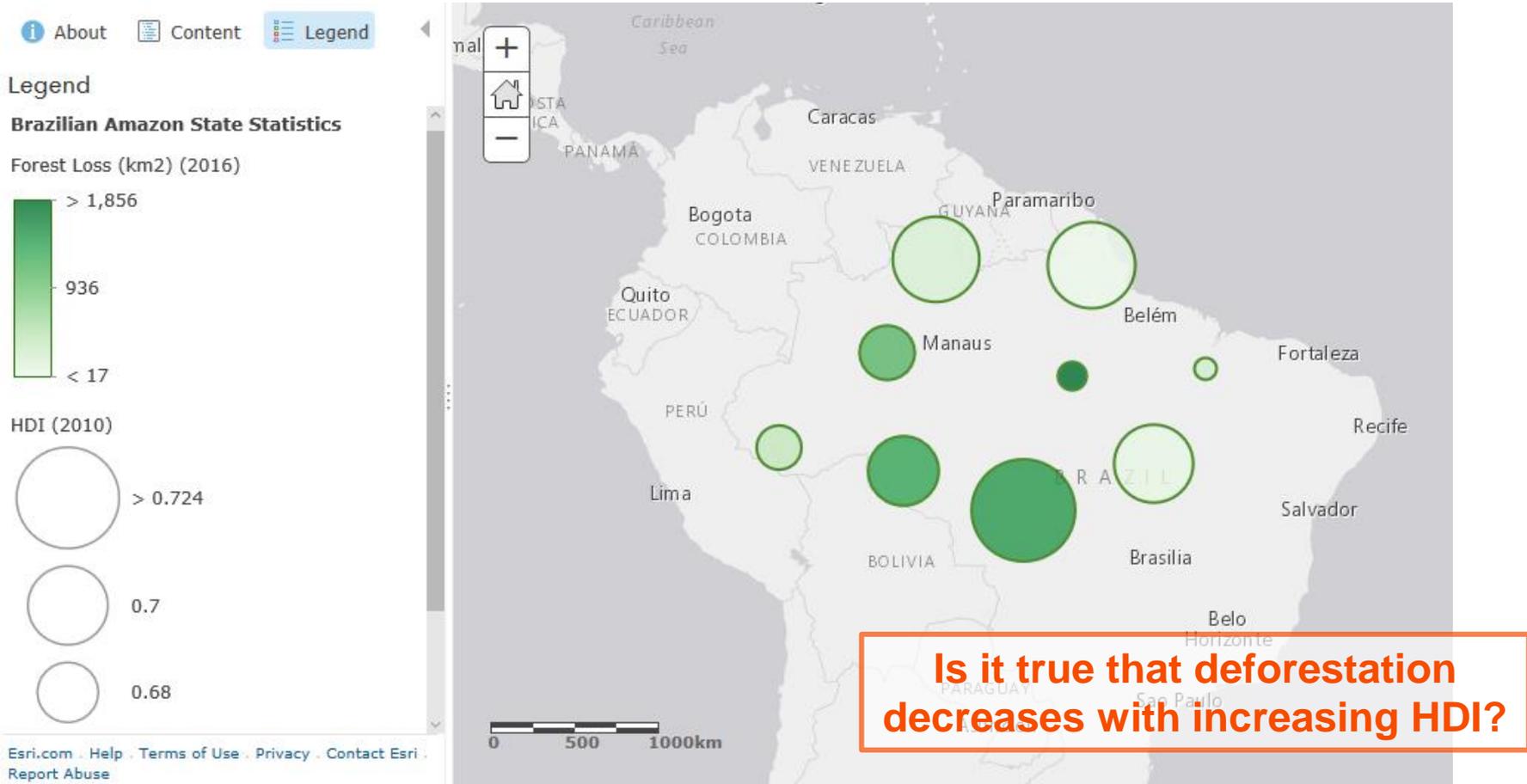
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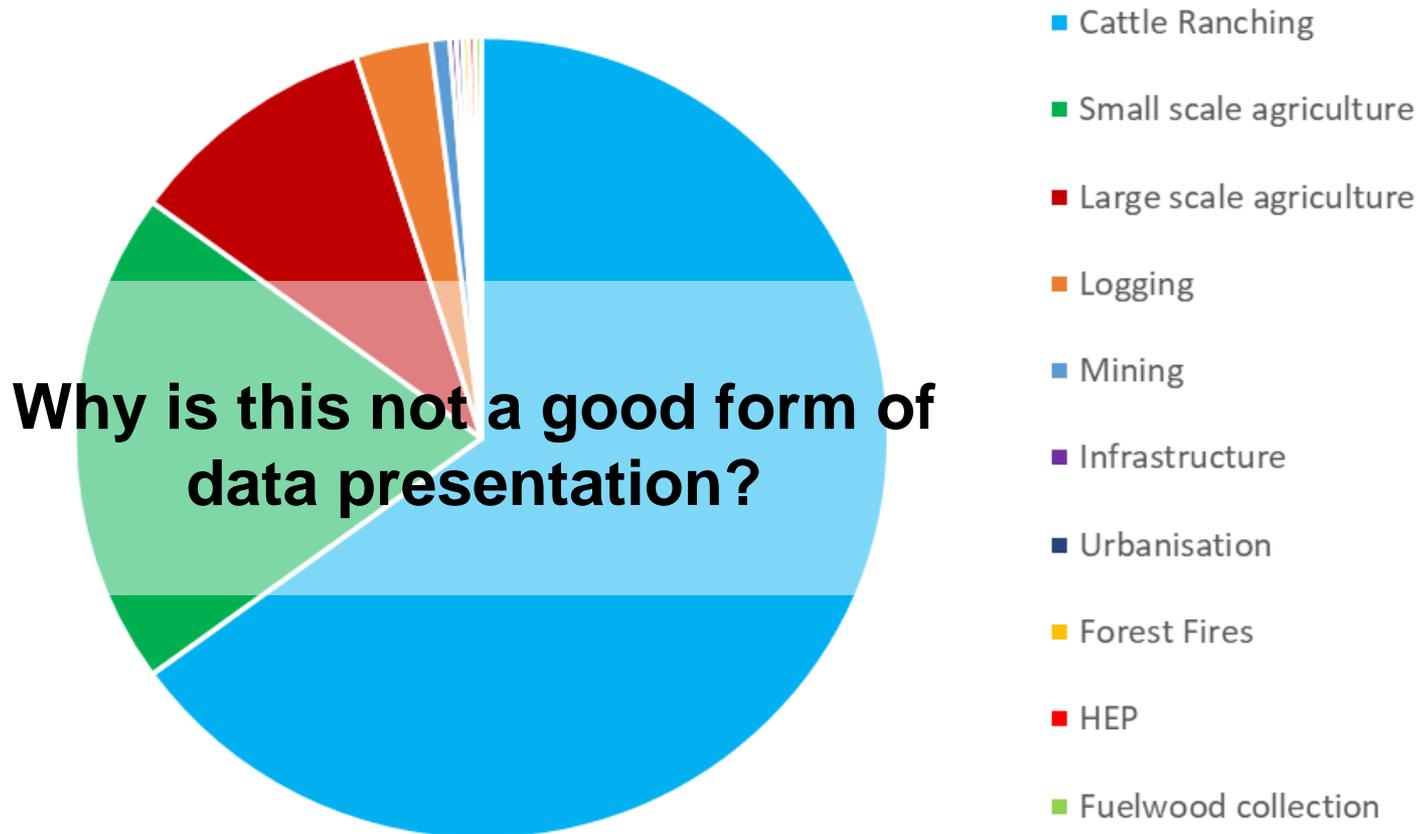
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Evaluating Pie Charts

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Causes of deforestation in a Tropical Rainforest

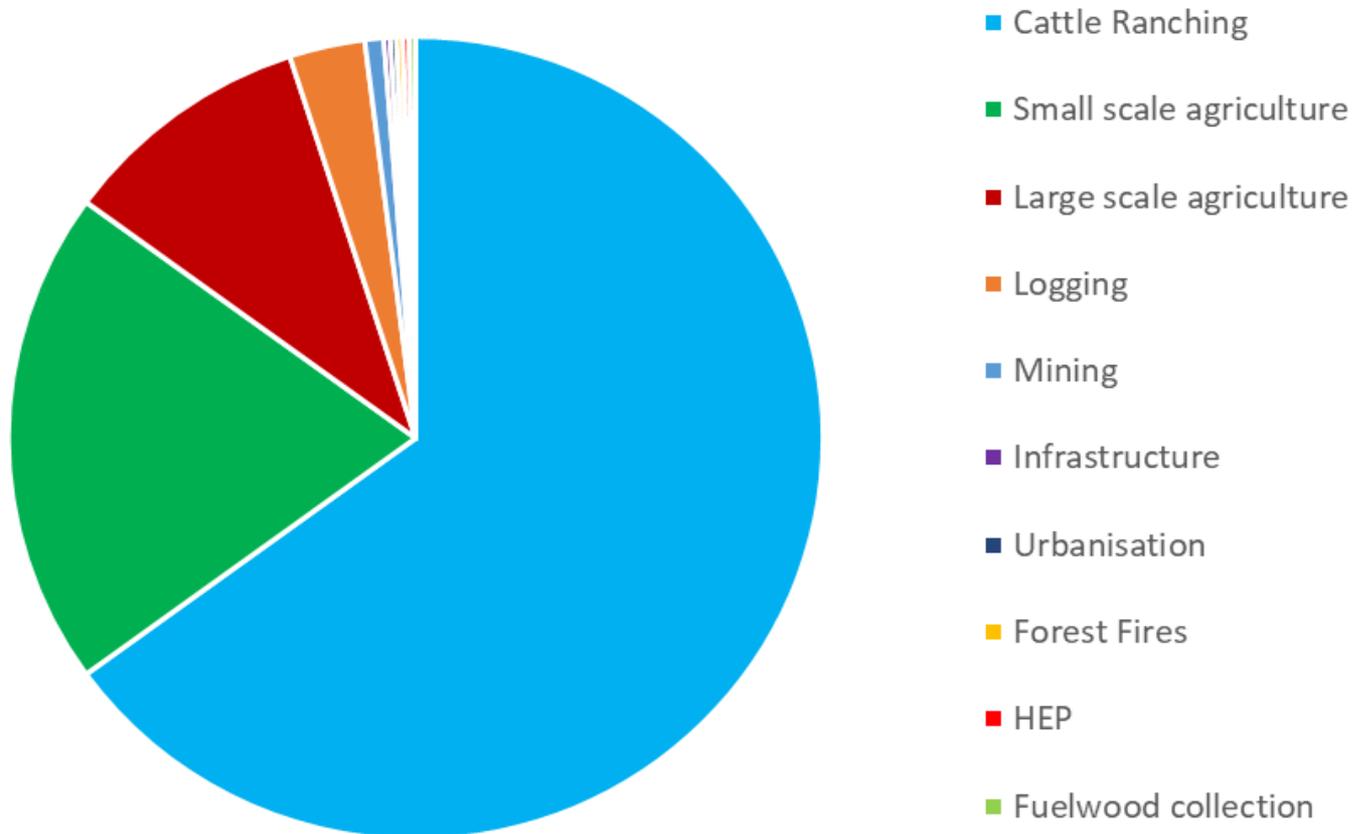


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Causes of deforestation in a Tropical Rainforest



■ Cattle Ranching

■ Small scale agriculture

■ Large scale agriculture

■ Logging

■ Mining

■ Infrastructure

■ Urbanisation

■ Forest Fires

■ HEP

■ Fuelwood collection



Deforestation in different countries



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Country	Area of forest cover (km ²)	Forest Cover	Loss as % of 2004 cover	Rate of deforestation change 2004 - 2014	Loss 2001-2014
Brazil	519,191,664	61.90%	4.90%	-6.00%	38,336,733
DR Congo	199,224,295	87.10%	3.20%	22.90%	7,977,010
Indonesia	160,978,096	85.80%	9.60%	2.40%	18,507,771
Colombia	81,779,083	72.60%	2.50%	-9.70%	2,822,694
Peru	78,069,516	60.90%	2.10%	16.40%	1,949,886
Bolivia	64,520,862	60.00%	4.20%	7.50%	3,394,108
Venezuela	56,531,450	62.80%	1.80%	-13.30%	1,376,709
Angola	55,315,474	44.40%	2.60%	19.40%	1,740,011
Mexico	53,182,952	27.40%	3.70%	-9.90%	2,587,661