Report for Forest Query into Global Deforestation, 1990 to 2016

Forest Query is on a mission to combat deforestation around the world and to raise awareness about this topic and its impact on the environment. The data analysis team at Forest Query has obtained data from the World Bank that includes forest area and total land area by country and year from 1990 to 2016, as well as a table of countries and the regions to which they belong.

The data analysis team has used SQL to bring these tables together and to query them in an effort to find areas of concern as well as areas that present an opportunity to learn from successes.

## 1. **GLOBAL SITUATION**

According to the World Bank, the total forest area of the world was \_\_ 41282694.9\_\_ in 1990. As of 2016, the most recent year for which data was available, that number had fallen to\_\_39958245.9\_\_, a loss of \_\_ -1324449\_\_, or \_\_ 1.03314582435161\_\_%.

The forest area lost over this time period is slightly more than the entire land area of \_\_Russian Federation\_\_ listed for the year 2016 (which is \_\_31809350.9\_\_).

## 2. **REGIONAL OUTLOOK**

In 2016, the percent of the total land area of the world designated as forest was \_\_ 31.3755709643095\_\_. The region with the highest relative forestation was\_\_ Latin America & Caribbean \_\_, with \_\_ 98.2576939676578 \_\_%, and the region with the lowest relative forestation was \_\_ Europe & Central Asia \_\_, with \_\_ 0.000535997085208853 \_\_% forestation.

In 1990, the percent of the total land area of the world designated as forest was \_\_ 32.4222035575689\_\_. The region with the highest relative forestation was\_\_ Latin America & Caribbean\_\_, with \_\_ 98.9102567906805\_\_%, and the region with the lowest relative forestation was \_\_ Europe & Central Asia\_\_, with \_\_ 0.000643839631311672\_\_% forestation.

Table 2.1: Percent Forest Area by Region, 1990 & 2016:

|  |  |  |
| --- | --- | --- |
| Region | 1990 Forest Percentage | 2016 Forest Percentage |
|  |  |  |
|  |  |  |
|  |  |  |

The only regions of the world that decreased in percent forest area from 1990 to 2016 were \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (dropped from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_% to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_%) and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_% to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_%). All other regions actually increased in forest area over this time period. However, the drop in forest area in the two aforementioned regions was so large, the percent forest area of the world decreased over this time period from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_% to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_%.

## 3. **COUNTRY-LEVEL DETAIL**

### SUCCESS STORIES

There is one particularly bright spot in the data at the country level, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This country actually increased in forest area from 1990 to 2016 by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It would be interesting to study what has changed in this country over this time to drive this figure in the data higher. The country with the next largest increase in forest area from 1990 to 2016 was the\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, but it only saw an increase of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, much lower than the figure for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are of course very large countries in total land area, so when we look at the largest *percent* change in forest area from 1990 to 2016, we aren’t surprised to find a much smaller country listed at the top. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ increased in forest area by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_% from 1990 to 2016.

### LARGEST CONCERNS

Which countries are seeing deforestation to the largest degree? We can answer this question in two ways. First, we can look at the absolute square kilometer decrease in forest area from 1990 to 2016. The following 3 countries had the largest decrease in forest area over the time period under consideration:

Table 3.1: Top 5 Amount Decrease in Forest Area by Country, 1990 & 2016:

|  |  |  |
| --- | --- | --- |
| Country | Region | Absolute Forest Area Change |
|  |  |  |
|  |  |  |
|  |  |  |

The second way to consider which countries are of concern is to analyze the data by percent decrease.

Table 3.2: Top 5 Percent Decrease in Forest Area by Country, 1990 & 2016:

|  |  |  |
| --- | --- | --- |
| Country | Region | Pct Forest Area Change |
|  |  |  |
|  |  |  |
|  |  |  |

When we consider countries that decreased in forest area the most between 1990 and 2016, we find that four of the top 5 countries on the list are in the region of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The countries are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The 5th country on the list is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which is in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ region.

From the above analysis, we see that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the only country that ranks in the top 5 both in terms of absolute square kilometer decrease in forest as well as percent decrease in forest area from 1990 to 2016. Therefore, this country has a significant opportunity ahead to stop the decline and hopefully spearhead remedial efforts.

### QUARTILES

Table 3.3: Count of Countries Grouped by Forestation Percent Quartiles, 2016:

|  |  |
| --- | --- |
| Quartile | Number of Countries |
|  |  |
|  |  |
|  |  |
|  |  |

The largest number of countries in 2016 were found in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ quartile.

There were \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ countries in the top quartile in 2016. These are countries with a very high percentage of their land area designated as forest. The following is a list of countries and their respective forest land, denoted as a percentage.

Table 3.4: Top Quartile Countries, 2016:

|  |  |  |
| --- | --- | --- |
| Country | Region | Pct Designated as Forest |
|  |  |  |
|  |  |  |
|  |  |  |

## 5. RECOMMENDATIONS

*Write out a set of recommendations as an analyst on the ForestQuery team.*

* *What have you learned from the World Bank data?*
* *Which countries should we focus on over others?*
* SQL queries used

1. Global Situation

# 1. Create a **View** called **“forestation”** by joining all three tables - **forest\_area, land\_area** and **regions** in the workspace.

# 2. The **forest\_area** and **land\_area** tables *join* on both **country\_code** AND **year**.

# 3. The **regions** table joins these based on only **country\_code**

# 4. In the ‘forestation’ View, include the following:

# **All of the columns of the origin tables**

**#** A **new column** that provides the **percent of the land area that is designated as forest**.

CREATE OR REPLACE VIEW forestation AS

SELECT f.country\_code,

f.country\_name,

f.year,f.forest\_area\_sqkm,

l.total\_area\_sq\_mi\*2.59 as total\_area\_sqkm,

((f.forest\_area\_sqkm / (l.total\_area\_sq\_mi\*2.59)) \* 100) AS percent\_of\_the\_land\_area\_as\_forest,

r.region,

r.income\_group

FROM forest\_area f

JOIN land\_area l

ON f.country\_code=l.country\_code AND f.year=l.year

JOIN regions r

ON r.country\_code=l.country\_code;

# What was the total forest area (in sq km) of the world in 1990? Please keep in mind that you can use the country record denoted as “World" in the region table

SELECT region,

year,

forest\_area\_sqkm

FROM forestation

WHERE region='World' AND year=1990;

# What was the total forest area (in sq km) of the world in 2016? Please keep in mind that you can use the country record in the table is denoted as “World.”

SELECT region,

year,

forest\_area\_sqkm

FROM forestation

WHERE region='World' AND year=2016;

# What was the change (in sq km) in the forest area of the world from 1990 to 2016?

SELECT year,

forest\_area\_sqkm,

LEAD(forest\_area\_sqkm) OVER (ORDER BY year)-forest\_area\_sqkm AS change

FROM forestation

WHERE region='World' AND (year=1990 OR year=2016);

# What was the percent change in forest area of the world between 1990 and 2016?

SELECT year,

forest\_area\_sqkm,

LEAD(forest\_area\_sqkm) OVER (ORDER BY year)-forest\_area\_sqkm AS change,

forest\_area\_sqkm/LEAD(forest\_area\_sqkm) OVER (ORDER BY year) AS percent\_change

FROM forestation

WHERE region='World' AND (year=1990 OR year=2016);

# If you compare the amount of forest area lost between 1990 and 2016, to which country's total area in 2016 is it closest to?

????????????

2. Regional Outlook

# Create a table that shows the Regions and their percent forest area (sum of forest area divided by sum of land area) in 1990 and 2016. (Note that 1 sq mi = 2.59 sq km)

SELECT year,region,

(forest\_area\_sqkm/total\_area\_sqkm)\*100 AS percent\_forest\_area

FROM forestation

WHERE year=1990 OR year=2016

# What was the percent forest of the entire world in 2016? Which region had the HIGHEST percent forest in 2016, and which had the LOWEST, to 2 decimal places?

SELECT year,region,

(forest\_area\_sqkm/total\_area\_sqkm)\*100 AS percent\_forest\_area

FROM forestation

WHERE year=2016 AND region='World'

# Which region had the HIGHEST percent forest in 2016

SELECT region, percent\_of\_the\_land\_area\_as\_forest

FROM forestation

JOIN (SELECT MAX(percent\_of\_the\_land\_area\_as\_forest) AS max

FROM forestation

WHERE year=2016) sub

ON forestation.country\_code=forestation.country\_code

WHERE forestation.percent\_of\_the\_land\_area\_as\_forest>=sub.max AND year=2016;

# and which had the LOWEST

SELECT region, percent\_of\_the\_land\_area\_as\_forest

FROM forestation

JOIN (SELECT MIN(percent\_of\_the\_land\_area\_as\_forest) AS min

FROM forestation

WHERE year=2016) sub

ON forestation.country\_code=forestation.country\_code

WHERE forestation.percent\_of\_the\_land\_area\_as\_forest<=sub.min AND year=2016;

# What was the percent forest of the entire world in 1990? Which region had the HIGHEST percent forest in 1990, and which had the LOWEST, to 2 decimal places?

SELECT year,region,

(forest\_area\_sqkm/total\_area\_sqkm)\*100 AS percent\_forest\_area

FROM forestation

WHERE year=1990 AND region='World'

# Which region had the HIGHEST percent forest in 1990,

SELECT region, percent\_of\_the\_land\_area\_as\_forest

FROM forestation

JOIN (SELECT MAX(percent\_of\_the\_land\_area\_as\_forest) AS max

FROM forestation

WHERE year=2016) sub

ON forestation.country\_code=forestation.country\_code

WHERE forestation.percent\_of\_the\_land\_area\_as\_forest>=sub.max AND year=1990;

# and which had the LOWEST,

SELECT region, percent\_of\_the\_land\_area\_as\_forest

FROM forestation

JOIN (SELECT MIN(percent\_of\_the\_land\_area\_as\_forest) AS min

FROM forestation

WHERE year=1990) sub

ON forestation.country\_code=forestation.country\_code

WHERE forestation.percent\_of\_the\_land\_area\_as\_forest<=sub.min AND year=1990;

# Based on the table you created, which regions of the world DECREASED in forest area from 1990 to 2016?