DEFORESTATION EXPLORATION

by
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Report for ForestQuery into Global Deforestation, 1990 to 2016

ForestQuery 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 ForestQuery 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 41,282,695 sqkm in 1990. As of 2016, the most recent year for which data was available, that number had fallen to 39,958,246 sqkm, a loss of 1,324,449 sqkm, or 3.21 %.

The forest area lost over this time period is slightly more than the entire land area of Peru listed for the year 2016 (which is 39,958,245 sqkm).

2. **REGIONAL OUTLOOK**

In 2016, the percent of the total land area of the world designated as forest was 41,282,695 sqkm. The region with the highest relative forestation was Latin America & Caribbean, with 46.16 %, and the region with the lowest relative forestation was Middle East & N.Africa, with 2.06 % forestation.

In 1990, the percent of the total land area of the world designated as forest was 32.42 %. The region with the highest relative forestation was Latin America & Caribbean, with 51.02 %, and the region with the lowest relative forestation was Middle East & N.Africa, with 1.77 % forestation.

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

Region	1990 Forest Percentage	2016 Forest Percentage
Latin America & Caribbean	51.02%	46.16%
Sub-Saharan Africa	30.67 %	28.78%
World	32.42 %	31.37%

The only regions of the world that decreased in percent forest area from 1990 to 2016 were Latin America & Caribbean (dropped from 51.02 % to 46.16 %) and Sub-Saharan Africa (30.67 % to 28.78 %). 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 32.42 % to 31.37 %.

3. **COUNTRY-LEVEL DETAIL**

A. SUCCESS STORIES

There is one particularly bright spot in the data at the country level, China. This country actually increased in forest area from 1990 to 2016 by 527.229 sqkm. 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 United States, but it only saw an increase of 79,200 sqkm, much lower than the figure for China.

China and United States 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. Iceland increased in forest area by 213.66 % from 1990 to 2016.

B. 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
Brazil	Latin America & Caribbean	541, 510 sqkm
Indonesia	East Asia and Pacific	282,194 sqkm
Myanmar	East Asia and Pacific	107,234 sqkm

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
Togo	Sub-Saharan Africa	75.44%
Nigeria	Sub-Saharan Africa	61.79%
Uganda	Sub-Saharan Africa	59.12%

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 Sub-Saharan Africa. The countries are Togo, Nigeria, Uganda, and Mauritania. The 5th country on the list is Honduras, which is in the Latin America & Caribbean region.

From the above analysis, we see that Nigeria 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.

C. QUARTILES

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

Quartile	Number of Countries
75 % +	9
50.01 - 75%	38
25% - 50 %	73
0-25%	85

The largest number of countries in 2016 were found in the 4th quartile.

There were 9 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:

APPENDIX

View Requirement:

```
CREATE OR replace VIEW forestation AS

SELECT r.country_name,
    r.country_code,
    r.region,
    r.income_group,
    f.year,
    f.forest_area_sqkm,
    f.forest_area_sqkm / 2.59 AS forest_area_sq_mi,
    la.total_area_sq_mi,
    la.total_area_sq_mi * 2.59 AS total_area_sqkm,
    (f.forest_area_sqkm / (la.total_area_sq_mi * 2.59)) * 100 AS percent_forest

FROM regions r
INNER JOIN forest_area f ON r.country_code = f.country_code
INNER JOIN land_area la ON f.country_code = la.country_code AND f.year = la.year
ORDER BY year, country_name
```

1. GLOBAL SITUATION

```
SELECT ROUND(forest_area_sqkm) AS forest_area_sqkm
FROM forestation
WHERE country_code= 'WLD' AND year = 1990;
SELECT ROUND(forest_area_sqkm) AS forest_area_sqkm
FROM forestation
WHERE country_code= 'WLD' AND year = 2016;
```

2.REGIONAL OUTLOOK

```
SELECT region, ROUND(MAX(percent_forest))
FROM forestation
WHERE year = 2016
GROUP BY 1
ORDER BY 2 DESC
LIMIT 1;

SELECT region, ROUND(forest_area_sqkm)
FROM forestation
WHERE region = 'World' AND  year = 1990

SELECT region, ROUND(MAX(percent_forest))
FROM forestation
WHERE year = 1990
GROUP BY 1
ORDER BY 2 DESC
LIMIT 1;
```

3. COUNTRY-LEVEL DETAIL

```
SELECT country_code, country_name,
ROUND(SUM(forest_area_sqkm))/(SUM(total_area_sqkm)) * 100 AS percent , year
FROM forestation f
WHERE year in (1990, 2016)
GROUP BY 1 ,  year, country_code, country_name
ORDER BY country_name
```

```
SELECT  country_name,  "1990",  "2016", ROUND("2016"-"1990") AS forest_change,
( ( "2016" - "1990" ) / "1990" ) * 100 AS percent, country_name
        FROM (SELECT
        MAX(case when (year = 1990) then forest_area_sqkm else NULL end) as "1990",
        MAX(case when (year = 2016) then forest_area_sqkm else NULL end) as "2016", country_name, region
        FROM forestation
        GROUP BY country_name ) sub

ORDER BY percent, forest_change, "2016" ASC;
```

```
SELECT country_code, country_name, "1990", "2016", ROUND("2016"-"1990") AS forest_change, region
FROM
        (SELECT country_code, region,
        ROUND(MAX(case when (year = 1990) then forest_area_sqkm  else NULL end)) as "1990"*
        ROUND(MAX(case when (year = 2016) then forest_area_sqkm else NULL end)) as "2016",

country_namc
FROM forestation
GROUP BY country_code, country_name, region) sub
ORDER BY forest_change ASC;
```

QUARTILES

```
Select quartile, country, percent_forest
FROM
(SELECT percent_forest, country_name AS country,
CASE
   WHEN percent_forest <= 25 THEN 4
   WHEN percent_forest <= 50 THEN 3
   WHEN percent_forest <= 75 THEN 2
   ELSE 1
END AS quartile
FROM forestation
WHERE YEAR = 2016) as sub
WHERE quartile = 1
ORDER BY percent_forest ASC;
```

```
Select quartile, country, percent_forest
FROM
       (SELECT percent_forest, country_name AS country,
CASE
    WHEN percent_forest <= 25 THEN 4
    WHEN percent_forest <= 50 THEN 3
    WHEN percent_forest <= 75 THEN 2
    ELSE 1
END AS quartile
FROM forestation
WHERE YEAR = 2016) as sub
WHERE quartile = 1
ORDER BY percent_forest ASC;
```