

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 **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 **-132449** 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 **1279999.9891**).

2. REGIONAL OUTLOOK

In 2016, the percent of the total land area of the world designated as forest was **31.37** 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 and North Africa**, with **2.07%** 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 **51.03%**, and the region with the lowest relative forestation was **Middle East and North 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	51.031	46.163
SUB Saharan Africa	32.189	27.555
World	32.422	31.375

The only regions of the world that decreased in percent forest area from 1990 to 2016 were Latin America & Caribbean (dropped from 51.031% to 46.163%) and SUB Saharan Africa (32.189 % to 27.555%). 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 32.422 % to 31.375%.

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 527229.062 .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 79200, 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 AND CARIBBEAN	541510
INDONESIA	EAST ASIA AND PACIFIC	282193.98

MYANMAR	EAST ASIA AND PACIFIC	107234.00
NIGERIA	SUB SAHARAN AFRICA	106506.00
TANZANIA	SUB SAHARAN AFRICA	102320

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	-59.27
MAURITANIA	SUB SAHARAN AFRICA	-46.74
HONDURUS	LATIN America AND CARIBBEAN	-45.45

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 **HONDURUS**, which is in the **LATIN America AND 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

The largest number of countries in 2016 were found in the **0-25%** 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 3.3: Count of Countries Grouped by Forestation Percent Quartiles, 2016:

Quartile	Number of Countries
0-25%	85
25-50%	73
50-75%	38
75-100%	9

Table 3.4: Top Quartile Countries, 2016:

Country	Region	Pct Designated as Forest
SURINAME	LATIN AMERICA AND CARIBBEAN	98.25
MICRONESIA	EAST ASIA AND PACIFIC	91.85
GABON	SUB SAHARAN AFRICA	90.03
SEYCHELLES	SUB SAHARAN AFRICA	88.41
PALAU	EAST ASIA AND PACIFIC	87.60
AMERICAN SAMOA	EAST ASIA AND PACIFIC	87.50

5. RECOMMENDATIONS

Based on my Findings, Globally, The Forest Area has decreased over the period from 1990 to 2016. This deforestation leads to Global Warming. Countries from Sub Saharan Africa like Togo, Nigeria and Country Honduras need to be focused more to reduce the deforestation.

Appendix

(SQL Queries)

A1. Global Situation

```
/*select all the columns from forestation view*/  
create view forestation as  
select f.country_code,f.country_name,f.year,f.forest_area_sqkm,  
l.total_area_sq_mi,r.region,r.income_group,  
(forest_area_sqkm/(total_area_sq_mi*2.59)*100) as percent_forest_area  
from forest_area f  
join land_area l  
on f.year=l.year and f.country_code = l.country_code  
join regions r  
on r.country_code=f.country_code and  
r.country_code=l.country_code
```

What was the total forest area(in sq km)of the world in 1990?

```
select year,country_code,forest_area_sqkm from forestation  
where year =1990 and country_code='WLD'
```

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 year,country_code,forest_area_sqkm  
from forestation  
where year =2016 and country_code='WLD'
```

*/*INNER SELF JOIN from forestation*/*

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

```
SELECT t1.forest_area_sqkm forestarea_2016,  
t2.forest_area_sqkm forestarea_1990,(t1.forest_area_sqkm -  
t2.forest_area_sqkm)as difference  
from forestation t1  
join forestation t2  
on t1.year = 2016 and t2.year = 1990 and  
t1.country_name='World' and t2.country_name='World'
```

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

```
SELECT t1.forest_area_sqkm forestarea_2016,
```

```

t2.forest_area_sqkm forestarea_1990,
((t1.forest_area_sqkm- t2.forest_area_sqkm)/t2.forest_area_sqkm)*100
    as percent_change
from forestation t1
inner join forestation t2
on t1.year=2016 and t2.year=1990 and
t1.country_name='World' and t2.country_name='World'

```

/* ABS FUNCTION TO FIND THE CLOSEST VALUE/*

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?

```

select t4.country_name, (t4.total_area_sq_mi*2.59) as totalarea,
abs(t3.difference-t4.total_area_sq_mi*2.59) as result
from
(select t1.year, t1.country_name, abs(t1.forest_area_sqkm-
t2.forest_area_sqkm) as difference
from forestation t1
join forestation t2
on t1.year='2016' and t2.year='1990'
where t1.country_name='World' and
t2.country_name='World') t3, forestation t4
where t4.year=2016
order by 3 asc

```

A2. REGIONAL OUTLOOK

/* created regional table from forestation /*

```

create table regional as
select region, year, sum(forest_area_sqkm) forestarea,
sum(total_area_sq_mi*2.59) totalarea,
(sum(forest_area_sqkm)/(sum(total_area_sq_mi*2.59))*100) as
percent_forestarea
from forestation
group by 2,1

```

/* select all the columns from regional table*/

What was the percent forest of the entire world in 2016?

```

select year, percent_forestarea
from regional
where year=2016 and region='World'

```

Which region had the HIGHEST percent forest in 2016, and which had the LOWEST, to 2 decimal places?

```
select region, round(cast(float8
(sum(forest_area_sqkm)/sum(total_area_sq_mi*2.59))*100 as numeric),2)
as percent_forest_area
from forestation
where year=2016
group by 1
order by 2 desc
```

What was the percent forest of the entire world in 1990?

```
select year, percent_forestarea
from regional
where year=1990 and region='World'
```

Which region had the HIGHEST percent forest in 1990, and which had the LOWEST, to 2 decimal places?

```
select region, round(cast(float8
(sum(forest_area_sqkm)/sum(total_area_sq_mi*2.59))*100 as numeric),2)
as percent_forest_area
from forestation
where year=1990
group by 1
order by 2 desc
```

which regions of the world decreased in forest area from 1990 to 2016?

```
select r1.region,r1.percent_forestarea as p,r2.percent_forestarea as
c,
(r2.percent_forestarea-r1.percent_forestarea)decreased
from regional r1
join regional r2
on r1.year=1990 and r2.year=2016 and r1.region=r2.region
order by decreased
```

A3. COUNTRY-LEVEL DETAIL

Which 5 countries saw the largest amount decrease in forest area from 1990 to 2016? What was the difference in forest area for each?

```
select t1.country_name,t1.forest_area_sqkm fa_1990,t2.forest_area_sqkm
fa_2016,
(t2.forest_area_sqkm - t1.forest_area_sqkm)forestarea_difference
from forestation t1
join forestation t2
on t1.year =1990 and t2.year=2016
and t1.country_name=t2.country_name
order by forestarea_difference
```

Which 5 countries saw the largest percent decrease in forest area from 1990 to 2016? What was the percent change to 2 decimal places for each?

```
select t1.country_name,t1.percent_forest_area
t1_1990,t2.percent_forest_area t2_2016,((t2.percent_forest_area -
t1.percent_forest_area)/t1.percent_forest_area)*100 as
percentforest_difference
from forestation t1
join forestation t2
on t1.year=1990 and t2.year=2016
and t1.country_name =t2.country_name
order by percentforest_difference
```

If countries were grouped by percent forestation in quartiles, which group had the most countries in it in 2016?

```
select count(t.country_name), t.quartiles
from (
select year,country_name,percent_forest_area pfa,
case
when percent_forest_area > 0 and percent_forest_area <=25 then '0-
25'
when percent_forest_area >= 25 and percent_forest_area <=50 then
'25-50'
when percent_forest_area >= 50 and percent_forest_area <=75 then
'50-75'
when percent_forest_area >=75 and percent_forest_area <=100 then
'75-100'
else 'NA'

```



```
end as quartiles
from forestation
where year = 2016)t
group by quartiles
```

List all of the countries that were in the 4th quartile (percent forest > 75%) in 2016.

```
select country_name, percent_forest_area
from forestation
where percent_forest_area > 75 and year=2016
order by 2 desc
```

How many countries had a percent forestation higher than the United States in 2016?

```
select count(country_name)
from forestation
where percent_forest_area > 33.92 and year=2016
```