# 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 41,282,694.9 sq. km in 1990. As of 2016, the most recent year for which data was available, that number had fallen to 39,958,245.9 sq. km, a loss of 1,324,449 sq. km, 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 1,280,000 sq. km).

## 2. **REGIONAL OUTLOOK**

In 2016, the percentage of the total land area of the world designated as forest was 31.38%. 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 & North Africa, with 2.07% forestation.

In 1990, the percentage 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 & North Africa, with 1.78% forestation.

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

| Region | 1990 Forest Percentage | 2016 Forest Percentage |
|---|---:|---:|
| Latin America & Caribbean | 51.03 | 46.16 |
| Europe & Central Asia | 37.28 | 38.04 |
| North America | 35.65 | 36.04 |
| Sub-Saharan Africa | 30.67 | 28.79 |
| East Asia & Pacific | 25.78 | 26.36 |
| South Asia | 16.51 | 17.51 |
| Middle East & North Africa | 1.78 | 2.07 |
| **World** | **32.42** | **31.38** |

The only regions of the world that decreased in percent forest area from 1990 to 2016 were Latin America & Caribbean (dropped from 51.03% to 46.16%) and Sub-Saharan Africa (30.67% to 28.79%). 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 31.38%.

# 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 527,229.1 sq. km. 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 sq. km, much lower than the figure for China.

China and the 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's forest area increased 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 (sq. km)** |
|---|---|---|
| Brazil | Latin America & Caribbean | –541,510 |
| Indonesia | East Asia & Pacific | –282,194 |
| Myanmar | East Asia & Pacific | –107,234 |
| Nigeria | Sub-Saharan Africa | –106,506 |
| Tanzania | Sub-Saharan Africa | –102,320 |

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 | –75.45% |
| Nigeria | Sub-Saharan Africa | –61.80% |
| Uganda | Sub-Saharan Africa | –59.13% |
| Mauritania | Sub-Saharan Africa | –46.75% |
| Honduras | Latin America & Caribbean | –45.03% |

When we consider countries that decreased in forest area percentage 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”

*Note: This report template and the instructions for the project as a whole do not seem to understand the meaning of quartiles. Properly grouping the countries by quartiles of forestation percentage should result in four groups of exactly 51 countries each, by the definition of what quartiles are. However, the task required here seems instead to be grouping the countries by forestation percentage with breakpoints at 25%, 50%, and 75%, which is a different concept altogether. Thus, I am putting the term “quartile” in quotation marks throughout this section to indicate that it does not actually refer to a quartile according to the proper definition of that term.*

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

| **“Quartile”** | **Number of Countries** |
|---|---:|
| 0–25% | 85 |
| 25–50% | 72 |
| 50–75% | 38 |
| 75–100% | 9 |

The largest number of countries in 2016 were found in the bottom (0–25%) “quartile”.

There were nine (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:

| Country | Region | Pct Designated as Forest |
|---|---|---|
| Suriname | Latin America & Caribbean | 98.26% |
| Micronesia, Fed. Sts. | East Asia & Pacific | 91.86% |
| Gabon | Sub-Saharan Africa | 90.04% |
| Seychelles | Sub-Saharan Africa | 88.41% |
| Palau | East Asia & Pacific | 87.61% |
| American Samoa | East Asia & Pacific | 87.50% |
| Guyana | Latin America & Caribbean | 83.90% |
| Lao PDR | East Asia & Pacific | 82.11% |
| Solomon Islands | East Asia & Pacific | 77.86% |

# 4. RECOMMENDATIONS

Clearly the primary focus of forest activists must be on the two world regions that saw forest loss from 1990 to 2016, which are Sub-Saharan Africa and the Latin America & Caribbean regions. In particular, it is important to investigate the root causes of deforestation in these areas and to determine the entities operating in those regions that are the primary drivers of forest loss. Have the decisions leading to deforestation in those regions been made by organizations and governments in those areas themselves, or have they been made by outside influences?

Also, while it does not rank as highly on a percentage basis, Brazil is the nation that has seen by far the most severe deforestation in an absolute sense during this time frame. Indeed, Brazil has seen more forest loss than the next three highest-ranking nations combined. This is especially alarming due to the great ecological diversity of the Amazon rainforest. ForestQuery and its allies in environmental advocacy must ensure that adequate funding and attention is allocated to Brazil, as it is likely to remain at the forefront of the deforestation struggle.

On a more positive note, there have been several countries that have seen significant gains in forestland from 1990 to 2016, such as Iceland, China, and the United States. Further research is needed to ascertain the reasons for forest gain in each of these three places. Moreover, it is striking that these three countries are so profoundly different in terms of culture, government, and geography. This fact is encouraging, as it suggests that forestland reclamation strategies can succeed under a variety of conditions if planned and executed properly.

# 5. APPENDIX: SQL Queries Used